Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

FEBRUARY 9, 1948
VOLUME 37, No. 3

AMERICAN DYESTUFF REPORTER

Joining distinguished company

To the Solophenyl group Geigy has added *Solophenyl Blue 2 R L.*

Possessed of the outstanding light fastness distinguishing the Solophenyl colors, this bright, reddish blue offers many other unusual properties, not the least of which is its ability to withstand anti-crease (urea formaldehyde) finishes with little shade change or effect on light fastness.

Comprehensive detail concerning Solophenyl Blue 2 R L is contained in *Bulletin # 1 G.* Cotton, Rayon and mixed fibre dyers will find this bulletin very interesting.

*Registered U. S. Patent Office

GEIGY COMPANY, INC.

89-91 BARCLAY STREET

Boston · Providence
Philadelphia · Charlotte
Chicago · Portland, Ore.
Toronto

Geigy

Dyestuff Makers Since 1859

NEW YORK—NEW YORK

In Great Britain
The Geigy Co., Ltd.
National Buildings
Parsonage, Manchester

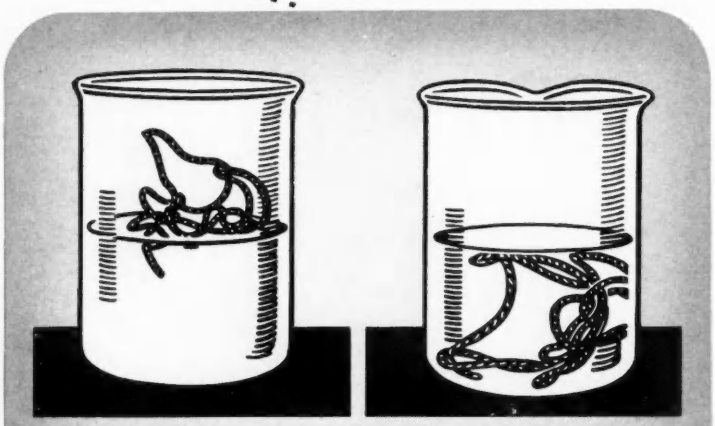
OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

FOR IMMEDIATE SINKING IN WATER . . .

IN IMMEDIATE SUPPLY . . .

AND IMMEDIATE DROPPING IN COSTS . . .

STANDARDIZE AT THE QUALITY LEVEL WITH



An example of the unmatched performance of DECERESOL OT Wetting Agent. At left, a cotton string floats indefinitely on water. At right, one drop of DECERESOL OT Wetting Agent causes instantaneous wetting.

. . . DECERESOL OT Wetting Agents

You get speedier application in the wetting of textiles – better penetration, dispersing and dye levelling properties – when you standardize on Cyanamid's DECERESOL° OT Wetting Agents, now again available in larger quantities.

But that is only *one* side of the story. DECERESOL OT Wetting Agents are also very economical to use. A little of it goes a long way. Its efficiency lowers costs, saves time.

And don't forget this *third* important advantage: the continual use of DECERESOL OT Wetting Agents results in *higher quality production*, as well.

If you are not now using DECERESOL OT Wetting Agents, it will pay you to write for further information about these superior wetting agents. Or, if you wish, one of our representatives will be glad to call and demonstrate DECERESOL OT Wetting Agents to you personally.

AMONG CYANAMID PRODUCTS FOR THE TEXTILE INDUSTRY ARE . . . AQUASOL° Sulfonated Castor Oils; NO-ODOROL° Finishing Oils; DECERESOL° OT Wetting Agents; PARAMUL°° 115 Water Repellent; Penetrants, Softeners, Finishes, Sizing Compounds, and other specialties and Heavy Chemicals. For low-cost chemical equivalent of distilled H_2O . . . FILT-R-STIL° Demineralizing Units.

SALES OFFICES: Boston, Mass.; Philadelphia, Pa.; Pittsburgh, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Cincinnati, Ohio; Chicago, Ill.; Detroit, Mich.; Kalamazoo, Mich.; St. Louis, Mo.; Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash. In Canada: Dillons Chemical Co., Ltd., Montreal and Toronto.

°Reg. U. S. Pat. Off. °°Trademark

American Cyanamid Company

Industrial Chemicals Division

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Designed Especially For You-

Handy
Compact
Easy to Read

Ciba's NEW DYERS' Slyd-Rul

(Made of plastic)

DYESTUFFS + CHEMICALS + INTERMEDIATES

CIBA COMPANY, INC.

Greenwich & Morton Sts.
NEW YORK

BOSTON - CHICAGO - MONTREAL - CHARLOTTE
PROVIDENCE - SAN FRANCISCO - PHILADELPHIA

VAT DYES OF THE DOW CHEMICAL COMPANY

Another example of Ciba's technical service to make your job easier.

The "LOOK" that Makes the Fabric...

A new design in rich rayon brocade for evening wear. Made up in pink, mauve and ice blue. Vat-dyed and sized.

Textile people know that fabrics possess that certain "look" of beauty only when they've been properly processed.

That explains why so many of America's leading mills, converters, finishers and dyers have turned to Colgate-Palmolive-Peet for high-quality wetting, fulling, scouring and dispersing agents.

Remember, there is a C.P.P. soap or synthetic detergent for every type of fabric—for every processing problem. Ask your local Colgate-Palmolive-Peet representative for details. Or, write today to Industrial Department, Colgate-Palmolive-Peet Company.

COLGATE FORMULA 25
For low-temperature washing ordinarily requiring olive oil soaps. Sold in eastern states only.

COLGATE WHITE SOAP FLAKES
High-grade thin white flakes. Not milled or polished. 90% anhydrous soap.

ARCTIC CRYSTAL FLAKES
Made from pure tallow, guaranteed to contain 88% or more soap. Titer approx. 42° C.

ARCTIC SYNTEX A, T, AND M
Synthetic detergents and wetting agents. Unsurpassed for many processing operations.

COLGATE FORMULA 10
92% oleic acid soda soap in flake form for silk degumming, wool scouring, all textile processing.

Colgate-Palmolive-Peet Company

Jersey City 2, N. J. • Atlanta 3, Ga. • Chicago 11, Ill. • Kansas City 3, Kans. • Berkeley 2, Calif.

SULPHONATED ESTOLS

Economically Supplant Sulphonated Oils and Tallows

Possess excellent color and odor properties.

Exhibit unusually good aging characteristics.

Do not liberate acrolein when heated.

Do not foam excessively.

Contain no mineral oil, or resinous, pectic or proteinaceous impurities.

- **SULPHONATED ESTOL F** for users of sulphonated oils
- **SULPHONATED ESTOL H** for users of sulphonated tallow

(Samples and literature upon request)

DREW Tested

YOUR ASSURANCE OF EXCELLENCE

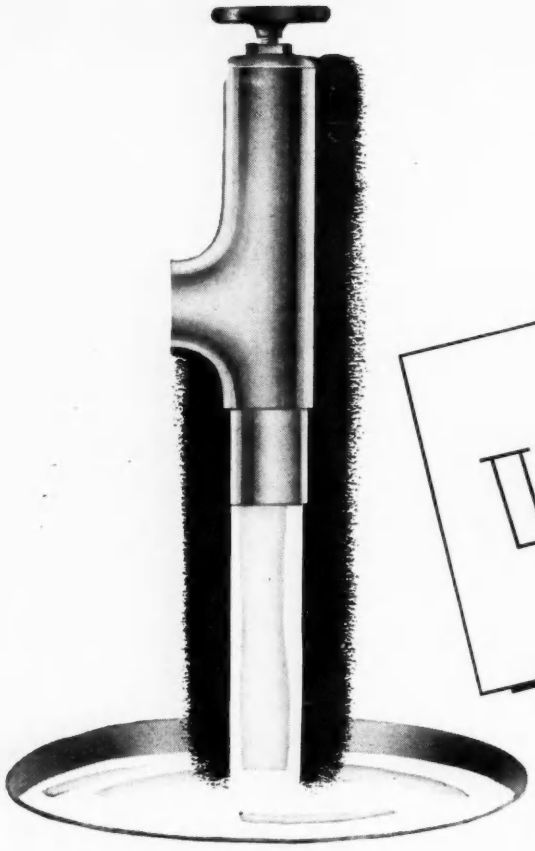
E. F. DREW & CO., INC.

15 EAST 26th STREET • NEW YORK 10, N. Y.

• FACTORY & LABORATORIES: BOONTON, N. J. •

BRANCH OFFICES:

CHICAGO · BOSTON · GREENVILLE, S. C. · MONTREAL, CANADA · RIO DE JANEIRO, BRAZIL · BUENOS AIRES, ARGENTINA



Vat Paste

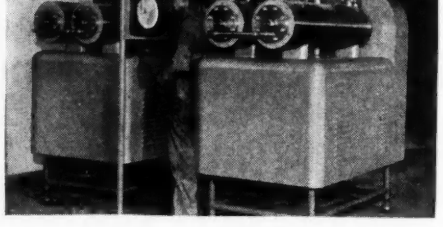
Let it Flow !

VOTATOR industrial starch processing apparatus, cooks, cools, and congeals vat paste in seconds, *as it flows through the apparatus.*

VOTATOR apparatus meets or beats open kettle volume in half the floor space used with open kettle equipment. Manpower requirements are cut to less than half. There is no spillage, no spoilage, no slimy deposit on the floor. Less starch produces more vat paste.

While decreasing vat paste processing cost, VOTATOR apparatus increases vat paste quality.

The continuous, closed, controlled VOTATOR operation uniformly affects all of the material and permits higher cooking temperatures. All of the starch particles are exploded. And you get an unusually fine vat paste, of smoother, more homogenous, more workable texture.

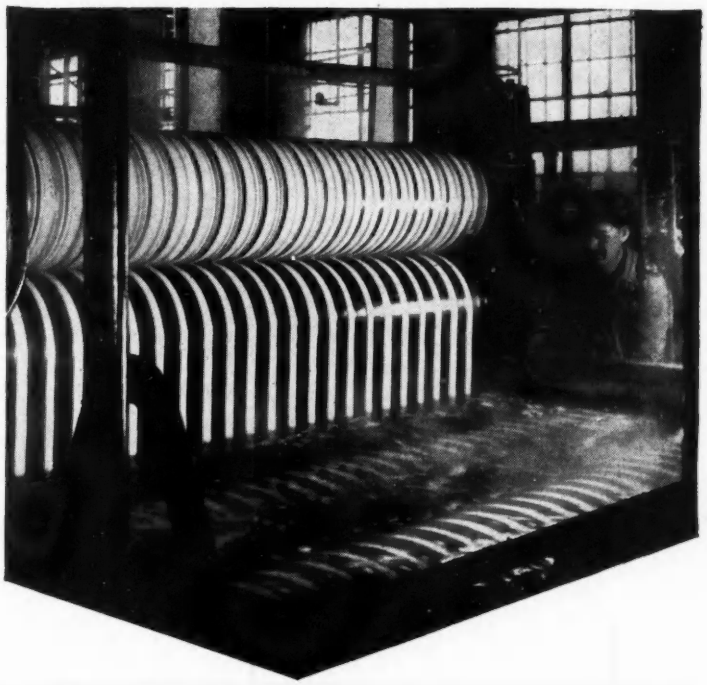


THE GIRDLER CORPORATION, VOTATOR DIVISION, LOUISVILLE 1, KY.
DISTRICT OFFICES: 150 Broadway, New York City 7 • 2612 Russ Bldg., San Francisco 4
505 Forsyth Bldg., Atlanta 3, Ga.

Votator — INDUSTRIAL STARCH PROCESSING APPARATUS

VOTATOR is a trade mark (Reg. U. S. Pat. Off.) applying only to products of The Girdler Corporation

Dyeing Assistants



Dyeing textiles is a chemical process . . . and the quality of your dyeing can be no finer than the quality of the chemicals you use. Dyers who want to be sure of their choice of dyeing assistants and other basic textile chemicals always—

SPECIFY "GENERAL CHEMICAL"

Select your basic textile chemicals from these General Chemical Products

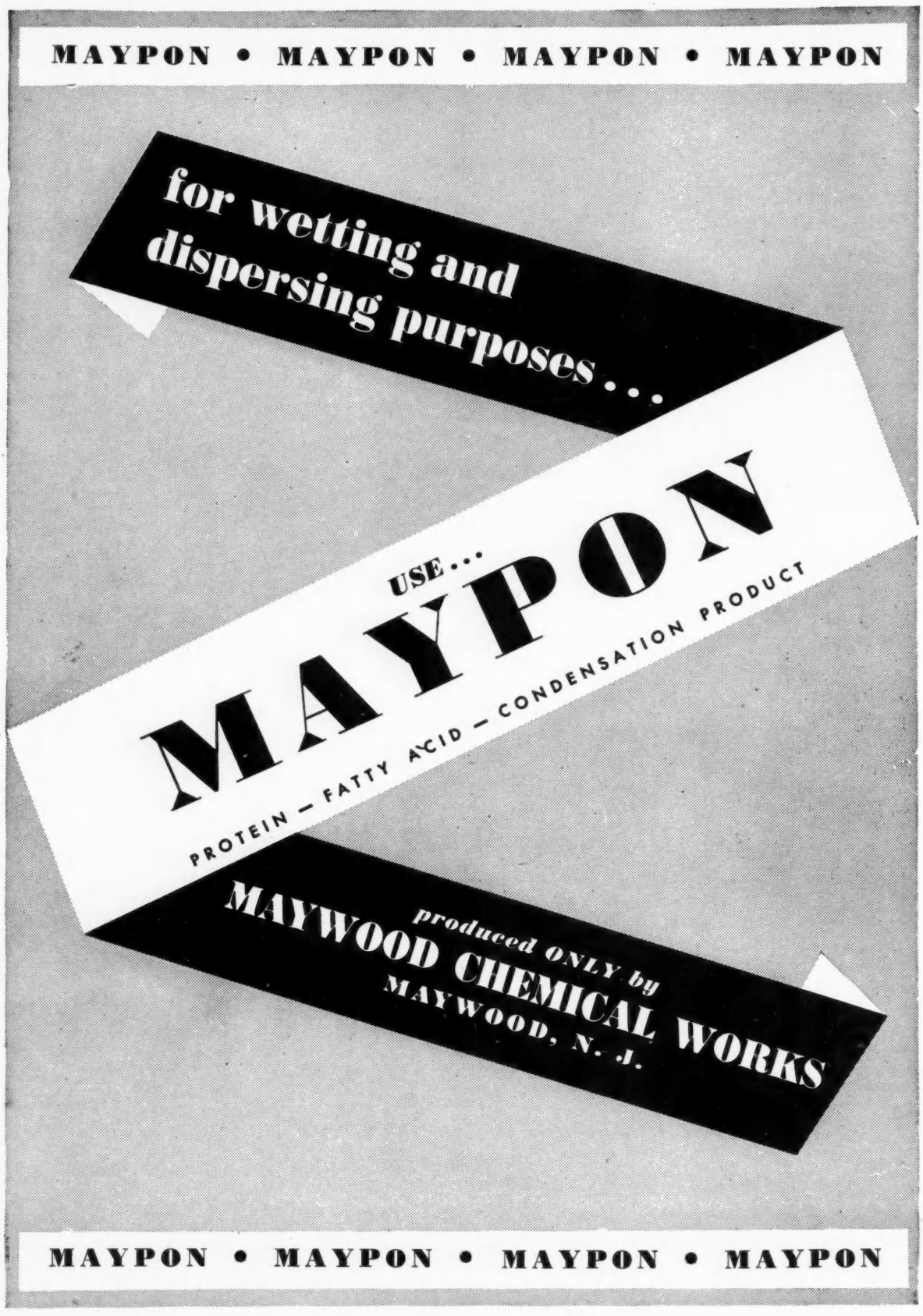
- Aqua Ammonia
- Acetic Acid
- Hydrofluoric Acid
- Muriatic Acid
- Sulfuric Acid
- Epsom Salt
- Glauber's Salt
- Sodium Bifluoride
- Sodium Bisulfite, Anhydrous
- Sodium Hyposulfite
- Sodium Metasilicate
- Sodium Silicate
- Disodium Phosphate, Anhydrous
- Tetrasodium Pyrophosphate
- Trisodium Phosphate
- Sodium Sulfide
- Oxalic Acid
- Chrome Alum
- Ferric Sulfate *(Iron Copperas Nitrate)*
- Sodium Sulfite, Anhydrous
- Nitre Cake
- Nitric Acid
- Mixed Acid
- Aluminum Sulfate
- Lead Acetate
- Aluminum Chloride, Solution

BASIC CHEMICALS

FOR AMERICAN INDUSTRY ©

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo Charlotte • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Portland (Ore.) Providence • San Francisco • Seattle • St. Louis • Wenatchee • Yakima (Wash.)
In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver


MAYPON • MAYPON • MAYPON • MAYPON
for wetting and dispersing purposes . . .
USE . . .
MAYPON
PROTEIN — FATTY ACID — CONDENSATION PRODUCT
produced ONLY by
MAYWOOD CHEMICAL WORKS
MAYWOOD, N. J.
MAYPON • MAYPON • MAYPON • MAYPON

HEYDEN chemicals
serve the nation's industries

CHLORINATED AROMATICS

Valuable as solvents and as intermediates in the manufacture of pharmaceuticals, dyes, fungicides, and other organic chemicals.

BENZYL CHLORIDE
Technical and refined grades – in 100-lb. carboys.

BENZOYL CHLORIDE
Information upon request.

BENZOTRICHLORIDE
Information upon request.

Chlorinated Benzaldehydes	**Ortho Chlor Benzaldehyde** Assay: 98.0% Containers: Glass carboys	**Para Chlor Benzaldehyde** Assay: 98.0% Containers: Fiber drums	**2,4-Dichlor Benzaldehyde** Assay: 97.0% Containers: Fiber drums	**3,4-Dichlor Benzaldehyde** Assay: 96.0% Containers: Fiber drums
Chlorinated Benzyl Chlorides	**Ortho Chlor Benzyl Chloride** Assay: 98.0% Containers: Glass carboys	**Para Chlor Benzyl Chloride** Assay: 97.0% Containers: Glass carboys	**2,4-Dichlor Benzyl Chloride** Assay: 97.0% Containers: Glass carboys	**3,4-Dichlor Benzyl Chloride** Assay: 96.0% Containers: Glass carboys
Chlorinated Benzoyl Chlorides	**Ortho Chlor Benzoyl Chloride** Assay: 95.0% Containers: Glass carboys	**Para Chlor Benzoyl Chloride** Assay: 98.0% Containers: Glass carboys	**2,4-Dichlor Benzoyl Chloride** Assay: 98.0% Containers: Glass carboys	**3,4-Dichlor Benzoyl Chloride** Assay: 95.0% Containers: Glass carboys
Chlorinated Benzotrichlorides	**Ortho Chlor Benzotrichloride** Assay: 98.0% Containers: Glass carboys	**Para Chlor Benzotrichloride** Assay: 98.0% Containers: Glass carboys	**2,4-Dichlor Benzotrichloride** Assay: 98.0% Containers: Fiber drums	**3,4-Dichlor Benzotrichloride** Assay: 96.0% Containers: Glass carboys
Chlorinated Toluenes	**Ortho Chlor Toluene** Assay: 99.0% Containers: Glass carboys or iron drums	**Para Chlor Toluene** Assay: 97.0% Containers: Glass carboys or iron drums	**2,4-Dichlor Toluene** Assay: 99.0% Containers: Glass carboys or iron drums	**3,4-Dichlor Toluene** Assay: 97.0% Containers: Glass carboys or iron drums
Chlorinated Benzoic Acids	**Ortho Chlor Benzoic Acid, Technical** Assay: 97.0% Containers: Wooden barrels (T&G lined)	**Para Chlor Benzoic Acid, Technical** Assay: 97.0% Containers: Wooden barrels (T&G lined)	**2,4-Dichlor Benzoic Acid, Technical** Assay: 97.0% Containers: Wooden barrels	**3,4-Dichlor Benzoic Acid, Technical** Assay: 97.0% Containers: Wooden barrels

You are invited to write for technical literature on these chemicals.

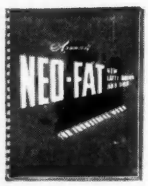
HEYDEN CHEMICAL CORPORATION
393 Seventh Ave., — New York 1, N. Y.
CHICAGO OFFICE, 20 North Wacker Drive
PHILADELPHIA OFFICE, 1700 Walnut Street

FINE HEYDEN CHEMICALS

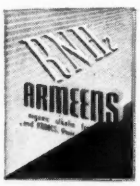
Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates • Formaldehyde • Formic Acid • Glycerophosphates • Medicinal Guaiacols • Hexamethylenetetramine • M.S.A. • Paraformaldehyde • Parahydroxybenzoates • Penicillin • Pentaerythritols • Salicylates

These new and important Armour chemicals give still broader scope to the rapidly expanding field of textile chemistry. Write today for any or all of the following booklets relevant to your specific fields of research. Yours without charge.

New Chemicals For Textile Chemists



NEO-FATS . . . Fractionated pure fatty acids. Uses: starting materials for synthetic detergents, resin coatings, emulsifiers, wetting agents, water-repellents, softeners, lubricants.



ARMEENS . . . Aliphatic amines (and ARMACS, their acetate salts). Textile uses: cationic emulsifiers, detergents, germicides, rodenticides, mildew resistants, fire-retardants, penetrants, water-repellents.

ARMIDS . . . Aliphatic amides. Among their many and varied textile applications: finishing waxes, coating resin ingredients, water-repellents, plastic anti-blocks.

ARNEELS . . . Aliphatic nitriles. Interesting textile applications as wetting agents, water-repellents, detergents, softeners, detergent aids, rodent repellents.

ARQUADS . . . Quaternary ammonium salts. Indicated textile uses include: cationic softeners, germicides, cationic emulsifying agents, algae controllers.

ARMOUR *Chemical* **DIVISION**

Armour and Company

1355 West 31st Street • Chicago 9, Illinois

A NEW MULTI-PURPOSE SYNTHETIC AUXILIARY

REPCOLENE is a clear, free flowing, non-jelling liquid.

REPCOLENE is an effective wetting, dispersing and levelling agent.

REPCOLENE is extremely stable and its activity is not affected by acids, alkalies, lime or the salts usually found in hard water.

REPCOLENE when dried into the fabric makes them highly absorbent.

REFINED PRODUCTS CORPORATION

Lyndhurst • New Jersey

• **Manufacturers of PERMA-CIDE, the approved, outstanding, mildew-proofing agent**

Southern Representative: DYER S. MOSS, 1301 Liberty Life Bldg., Charlotte, North Carolina

New England Representatives: E. L. LEGG, P. O. Box 597, Providence, R. I.
CLARENCE E. MOSS, 19 Wilson Ave., Rumford (16) R. I.

Canadian Selling Agents: Carbic Color and Chemical Co., Inc., 56 McNab Street South, Hamilton, Ontario

Exporting Agent: Chem-Col Company, 82 Wall St., New York City.

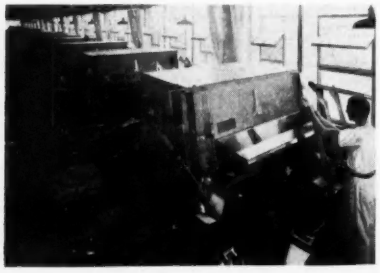
ONYX IONICS

Newsworthy Items for Textile Technologists and Production Men

February, 1948

Eternalure for Nylons Is Going Stronger than Ever

The number of mills using Eternalure to insure a full mellow soft hand on nylon hose is constantly increasing. Not only are "eye" and "touch" appeal improved on every gauge and denier of nylons, but the stitch is clarified and snag resistance is notably increased.



In the mill, Eternalure-finished hose are easier to handle after boarding, and pull threads are reduced materially. Deposits do not build up on the forms and hose do not stick to them.

Eternalure is easy to apply without changes in equipment or operations. It is not only completely safe for use from the production viewpoint, being non-toxic and non-flammable, but has been proved by exhaustive dermatological tests to have no primary irritating action and no sensitizing effect on the human skin.

Dull Your Rayon, Acetate and Nylon Piece Goods Without the Handicap of Harshness

Onyx Dullatone CA is a cation-active dispersible titanium dioxide with highly satisfactory performance in dulling and softening, particularly where light and medium colors are involved. It penetrates and spreads much better than ordinary dulling agents and leaves the goods without a harsh hand. Used in the pad or quetsch, through which the scoured and dyed fabrics are passed, Dullatone CA has the added advantage of making it much easier to clean up after use than the usual pigment dullers.

If you are interested in dull soft shades, with a much softer hand than you are able to get with other dulling agents, write for Onyx Technical Data Sheet #7-T which covers this material in detail.

Get Superior and *Permanent* Softening on Your Rayon, Acetate, Bemberg and Cotton Textiles

The Onyxsans assure a permanent, lofty, soft hand on all types of constructions involving these fibers. These cationic surface-active softening agents produce these effects because of properties imparted to the interior of the fibers. They do much more than superficial surface treatments can possibly achieve.

The Onyxsans are substantive to textile fibers, acting like dyestuffs and making themselves a *permanent* part of the textile, on rayon, acetate, bemberg and cotton. On Aralac, silk, wool and other fibers, they impart equally attractive hands.

The Onyxsans are easy to apply in the print washer, jig, dye beck, quetsch or starch mangle, and produce their characteristic effects with surprisingly small quantities.

The story of the Onyxsans has been brought up-to-date in the new Onyx Technical Bulletin TX-1. This informative manual covers the history of these outstanding softening agents from their inception nearly ten years ago to the latest addition to the series. Major advantages, applications and the chemical and physical characteristics of each member of the family are described in detail. If any of your products call for softening action, you will find Bulletin TX-1 very helpful. We shall, of course, be glad to supply samples of any of the Onyxsans for plant-scale tests.

NEW DEVELOPMENTS

For Further Details Write Onyx

Looking for a Good Size and Stiffener for Ribbons? Then you'll find Xyno Resin AA40 most satisfactory. This versatile aqueous dispersion of a vinyl resin requires no curing. It dries to a clear, tough film without impairing luster. No changes in operating procedure are involved in its use. No. 73

•

Improve Fluffiness of Dyed Wool Fabrics while you improve dye level by using Mapromol HSY as a dye auxiliary. This effective softening agent gives a dry but soft, lofty hand on all types of textile fabrics. Does not affect light fastness of dyed fabrics. No. 74

•

Faster, More Dependable Pasting up of Dyes is assured by NSAE Paste—the Onyx anionic wetting agent stable in acid solutions. In high concentrations, this material is one of the most effective penetrants available. No. 75

•

Non-Ionic Scouring Assistant for Acetates and Rayons. Neutronyx 330 is one of a series of non-ionic surface-active detergents with exceptional emulsifying properties. It is being used on this type of scouring with highly gratifying results. No. 76

Durable *Economical* Water Repellency

Compared with ordinary fugitive water repellent finishes, Repel-O-Tex D3 and D4 insure a definitely superior and lasting effect at lower cost. Textiles treated with these two complementary materials fall well within the limits of accepted standards of durability after the usual wash and dry cleaning tests. They are also made stain and perspiration resistant.

Cotton-rayon, acetate-rayon and many all rayon and acetate constructions are easily treated in the jig, pad or quetsch to provide durable repellency. The effect on other textiles is less lasting.

No curing, washing or any other after-handling is involved in the treatment. Onyx Technical Data Sheet #2-T carries the complete story of low cost, durable water repellency with Repel-O-Tex D3 and D4.

onyx CHEMICALS FOR DYEING • FINISHING • PRINTING

ONYX OIL & CHEMICAL COMPANY

JERSEY CITY 2, N. J.

CHICAGO • PROVIDENCE • CHARLOTTE • ATLANTA • LOS ANGELES

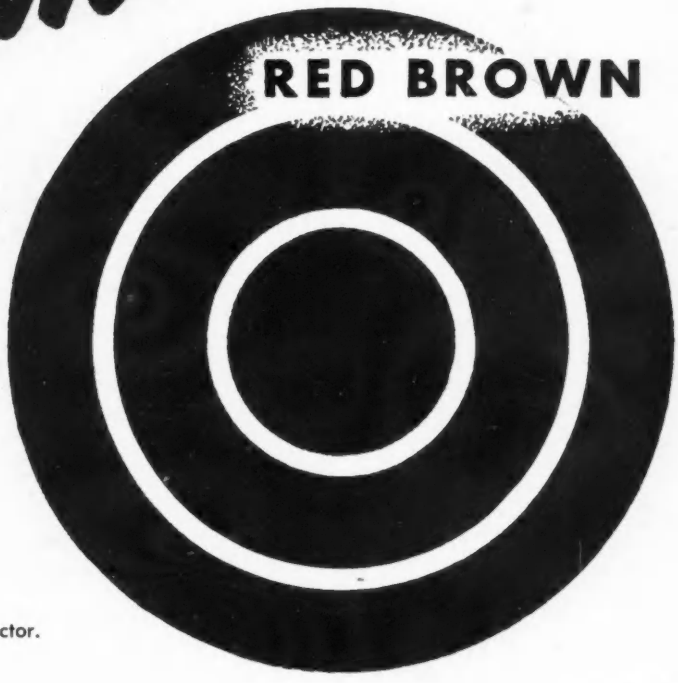
In Canada: Onyx Oil & Chemical Co., Ltd. Montreal, Toronto, St. Johns, Que.

For Export: Onyx International Jersey City 2, N. J.

AMANTHRENE* VAT COLORS
provide the answer to the demand for
better color fastness in textiles

Amanthrene

RED BROWN



in double paste or
double powder form

An excellent base color for deep chocolate browns and a shading element for taupes and tans where fastness to light, washing, chlorine and perspiration is a factor.

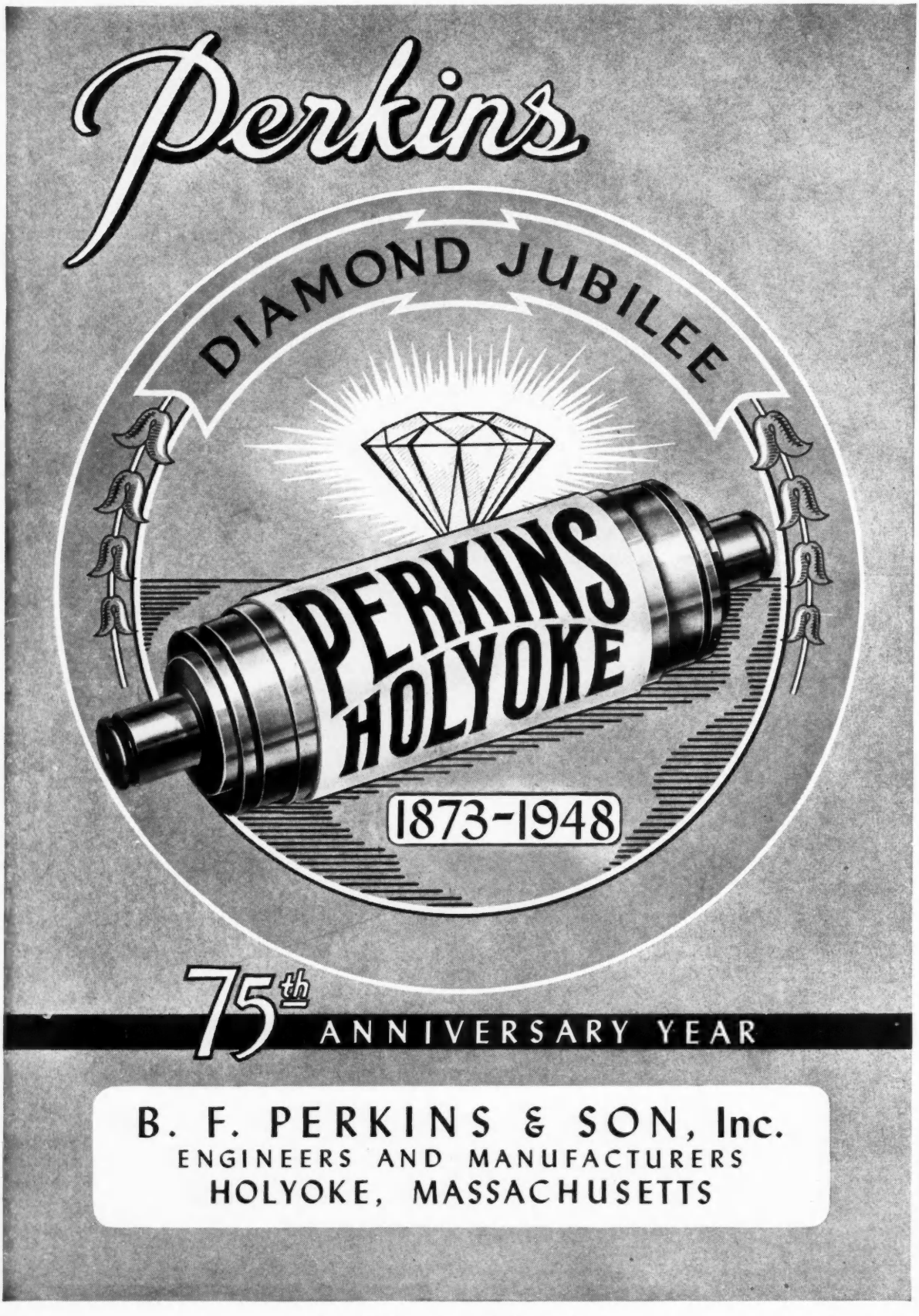
Satisfactorily meets the requirements for slip cover materials, upholstery fabrics, sports wear, and men's work clothes.

Suitable for cotton and rayon yarn in warp, beam and package dyeing equipment, as well as for skein work and hosiery. Well adapted, also, to jig and pad-jig dyeing of piece goods.

Another of the Amanthrene range of superior vat colors. For detailed information on the whole range available, as well as data regarding your own particular requirements, consult our nearest branch. A.A.P. technicians are always happy to be of service.

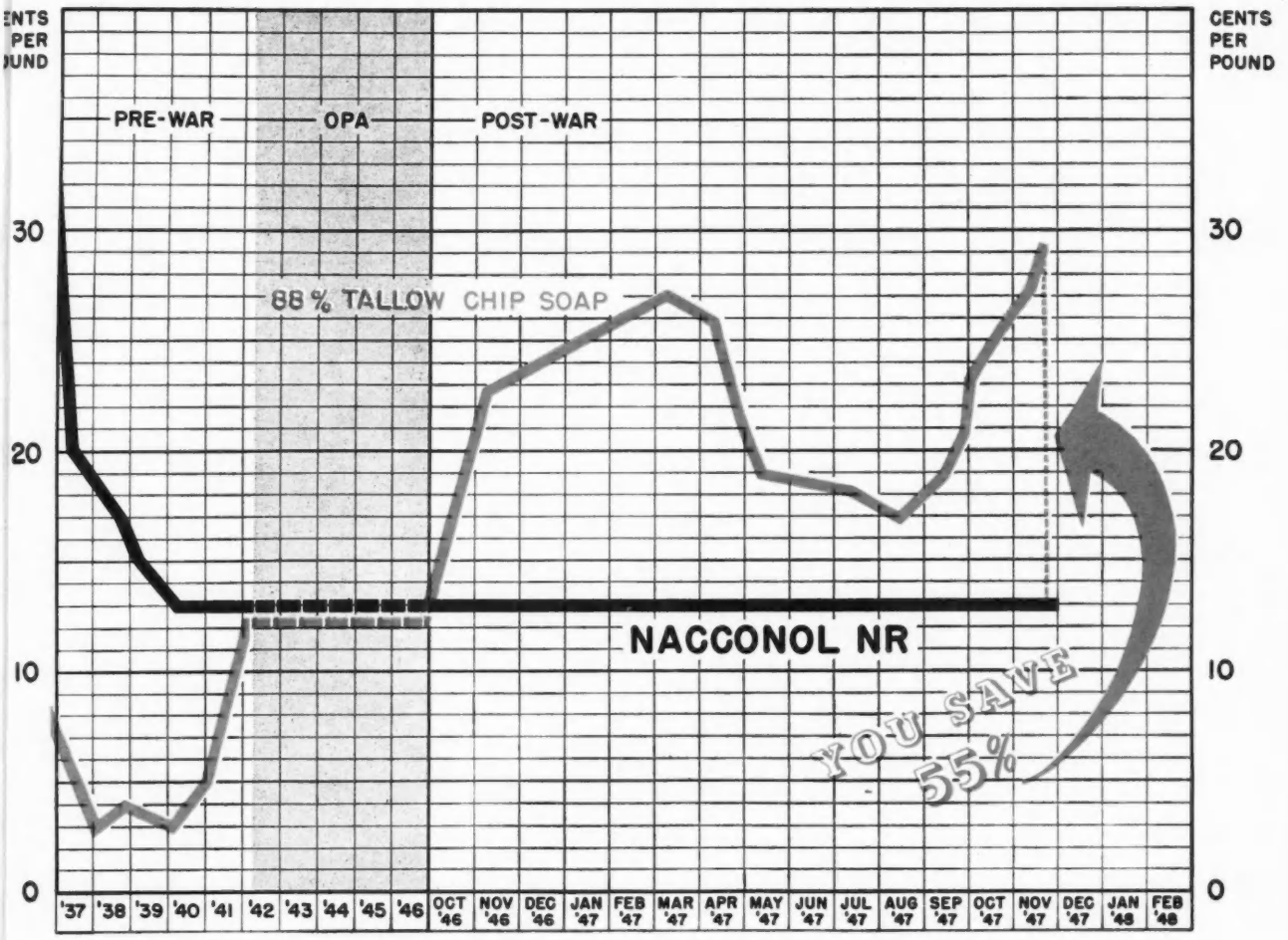
AMERICAN ANILINE PRODUCTS, INC., 50 Union Square, New York, N. Y. • ***Plant:*** Lock Haven, Pa.
Branches: Boston, Mass. • Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal.
Chattanooga, Tenn. • **Dominion Anilines & Chemicals Ltd.** • Toronto, Canada • Montreal, Canada

*Reg. U.S. Pat. Off.


Perkins
DIAMOND JUBILEE
PERKINS
HOLYOKE
1873-1948
75th ANNIVERSARY YEAR
B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASSACHUSETTS

Pictures Speak Louder Than Words

COST COMPARISON - NACCONOL NR vs SOAP


CENTS PER POUND
PRE-WAR
OPA
POST-WAR
30
20
10
0
88% TALLOW CHIP SOAP
NACCONOL NR
YOU SAVE 55%
'37 '38 '39 '40 '41 '42 '43 '44 '45 '46 OCT '46 NOV '46 DEC '46 JAN '47 FEB '47 MAR '47 APR '47 MAY '47 JUN '47 JUL '47 AUG '47 SEP '47 OCT '47 NOV '47 DEC '47 JAN '48 FEB '48

*Reg. U.S. Pat. Off.

Adopt **NACCONOL NR**
and cut your soap costs

National Aniline DIVISION · ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR ST., NEW YORK 6, N. Y. · BOSTON · PROVIDENCE · PHILADELPHIA · CHICAGO · SAN FRANCISCO · PORTLAND, ORE. GREENSBORO · CHARLOTTE · ATLANTA · NEW ORLEANS · CHATTANOOGA · TORONTO

Savings UP with NOPCO* FUA

The self-fulling, self-scouring wool oil whose remarkable versatility is proven daily in countless woolen mills, on all woolen processes.

IN THE CARDING PROCESS

. . . NOPCO FUA cuts down fly . . . won't gum or load the cards. It makes possible longer runs before stripping. It helps preserve natural life and cushion of the leather rub roll aprons, giving you a loftier, rounder roving. NOPCO FUA is non-corrosive. In short —NOPCO FUA makes possible extensive savings in time and equipment.

IN THE SPINNING PROCESS

. . . Here again, NOPCO FUA reduces ultimate costs. It is non-oxidizable. It does not become set in the yarn during steaming nor in the grey goods after steaming and crabbing, to cause cloudy, shady piece dyeings. NOPCO FUA performs equally well on mules or frames.

IN THE DYEING PROCESS

. . . On piece dyes, the minute residuum of NOPCO FUA (0.2% or less) is an actual aid to level dyeing. NOPCO FUA is a leveling agent in its own right.

IN THE FULLING AND SCOURING PROCESSES

. . . NOPCO FUA achieves remarkable results when used alone. No soaps or detergents are required. (Small amounts of a polyphosphate solution added to the soda ash solution enhance sudsing.) Goods slide better in the fulling mill . . . tangles or knock-offs are prevented. Further, NOPCO FUA produces quick, uniform shrinkage and reduced rinsing time.

NOTE THESE FURTHER ADVANTAGES OF NOPCO FUA

NOPCO FUA performs like an oil on the fibers during carding and spinning and like a soap in wet finishing. It is all fatty . . . contains no mineral oil or hydrocarbons. It is salt and ash free. NOPCO FUA needs no added equipment or change in procedure.

All in all, no other wool oil can lay claim to so many exclusive advantages as NOPCO FUA. No other can duplicate its versatile performance.

Send for Technical Bulletin T-23. It describes NOPCO FUA's aid to better, faster, more economical woolen processing.

NOPCO CHEMICAL COMPANY, Harrison, N. J.

Formerly National Oil Products Company

BRANCHES: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CALIF.

NOPCO TRADEMARK EVOLVED THRU RESEARCH

*Reg. U. S. Pat. Off.

NOPCO FUA

Self-Fulling Self-Scouring Wool Oil

Next to Her Skin . . .

The most beautiful *finishes on fabrics* are acquired by the consistent use of Watson-Park products.

WATSON-PARK CO.
261 FRANKLIN ST., BOSTON, MASS.
FACTORY — LOWELL JUNCTION, MASSACHUSETTS

calgon*

makes both soaps
and synthetic
detergents
more effective

—and that is only *one* of the ways in which it serves the textile industry. For the full story, send for our bulletin "Calgon Data for the Textile Chemist".

**T. M. Reg. U. S. Pat. Off.*

HAGAN
HALL
BUROMIN
CALGON

calgon, inc.

A SUBSIDIARY OF
HAGAN CORPORATION

HAGAN BUILDING
PITTSBURGH 30, PA.

FOR THE *Perfect Note* IN COLOR HARMONY

Clear, crisp prints . . . bright gay pastels . . . vibrant hues that strike the perfect note in fashion's harmony of color — these are the printing results assured with Keltex, the modern algin thickening agent.

Keltex insures true, full color values — prevents pigment migration — makes certain of exact printing paste viscosity and perfect penetration. It is equally effective in both machine and screen printing, ideal for the pad pigment method of vat dyeing.

Keltex is a product of nature, rigidly processed to insure consistently uniform results. It's entirely free of impurities, easy to apply and requires only a light wash for removal. For perfect printing of prints and pastels — and with economy too — you can depend on Keltex. We will be glad to send you full information on its adaptability to your particular application. Drop us a line today.

KELTEX . . . A PRODUCT OF

KELCO COMPANY

KELTEX REFINED ALGIN PRODUCT

20 N. Wacker Drive
CHICAGO—6

31 Nassau Street
NEW YORK—5

530 W. Sixth Street
LOS ANGELES—14

Cable Address: KELCOALGIN—New York

How to lick the high cost of fats

You hardly need to be reminded that the cost of most fats for finishing is rapidly becoming prohibitive. You may or may not realize however that there are products which can be used for these purposes which give better results at comparable cost or equal results at lower cost.

Among such products in the AHCO line are the following:—

AHCOVELS*

If your problem is primarily one of softening, one of our AHCOVELS will solve it. Although constantly improved, these synthetic substantive softeners have not changed in price for seven years. They give an unsurpassed hand, softness and drape to cotton, rayon, nylon, acetate or wool fabrics. Almost pure white in color, they are highly resistant to yellowing, very stable when subjected to heat and the E, F and R types do NOT affect the light fastness of colors. Small quantities, compared with sulphonated tallows, are required for a given result.

SOFTENER CDEP

If you need extra body with softness, SOFTENER CDEP is the solution to your cost and quality problems. It gives the same effect as sulphonated tallows but is considerably cheaper on a yard for yard basis.

When we suggest that you try these products, we are not asking you to experiment. Ahcovels are the most popular substantive softeners on the market and SOFTENER CDEP has also proved its value in volume production.

Let us recommend a formula for your softening or weighting problems.

*Trademark Reg.

ARNOLD, HOFFMAN & CO. INCORPORATED

MANUFACTURING CHEMISTS

ESTABLISHED 1815 • PLANTS AT DIGHTON, MASS. AND CHARLOTTE, N. C.

PROVIDENCE, RHODE ISLAND

NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE

TERGITOL *wetting agents are*

SPECIFIC

If you use water or an aqueous solution for one of the following operations, a *specific* TERGITOL wetting agent can save you money and processing time:

PENETRATING . . . porous materials such as textile fibers, paper, and leather.

WETTING . . . pigments, dyestuffs, powders, clay, cement, dust, and other dry materials.

SURFACE SPREADING on glass, metal, wood, plastic, or foliage surfaces — which ordinarily resist wetting.

EMULSIFYING . . . oils, resins, and chlorinated or water-insoluble solvents.

DE-EMULSIFYING . . . many water-oil and solvent-water emulsions.

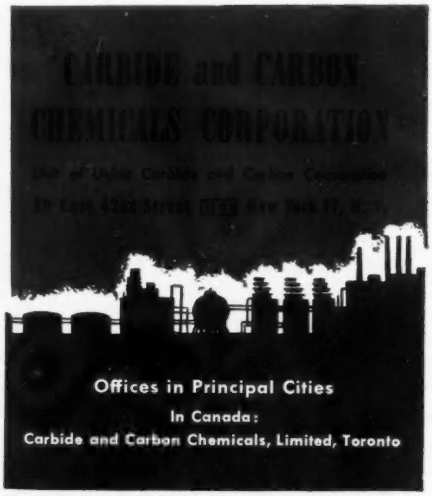
TERGITOL 7 . . . for dilute aqueous solutions containing less than 1 per cent dissolved solids.

TERGITOL P-28 . . . for water solutions containing 2 to 5 per cent inorganic salts or 1 to 2 per cent alkalies.

TERGITOL 4 . . . for solutions containing from 1 to 10 per cent acids or salts, or 2 to 5 per cent alkalies.

TERGITOL 08 . . . for solutions containing 10 to 20 per cent acids or alkalies.

TERGITOL EH . . . for solutions containing 20 to 30 per cent dissolved inorganic acid, base, or salt.



TERGITOL is a registered trade-mark of C & CC.

The five TERGITOL wetting agents are powerful, fast-acting surface-tension depressants. These easy-to-use liquids are available in commercial quantities. They are inexpensive—a little goes a long way. For help in choosing the most suitable TERGITOL wetting agent for your application call or write our nearest office. When writing, please address Dept. **A-2.**

NYANZA

ANILINE & ALIZARINE COLORS

•

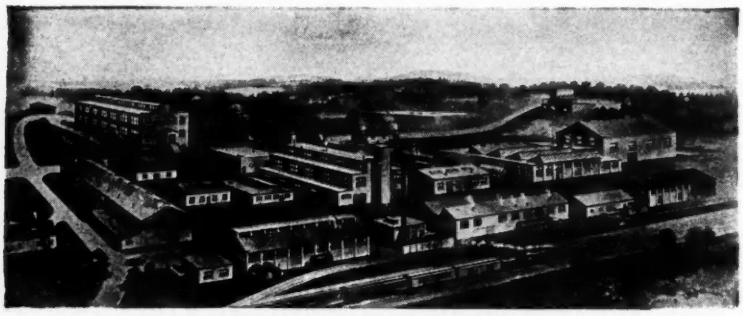
TEXTILE CHEMICALS

•

FINISHING MATERIALS

FOR

WOOL—COTTON—RAYON—ACETATE
AND MIXED FIBERS



FACTORY AT ASHLAND, MASSACHUSETTS

NYANZA COLOR & CHEMICAL COMPANY, Inc.

109 WORTH STREET NEW YORK 13, N. Y.

FACTORIES:

CHEMICAL MANUFACTURING CO., ASHLAND, MASS. • NEW BRUNSWICK CHEMICAL CO., NEWARK, N. J.

BRANCHES:

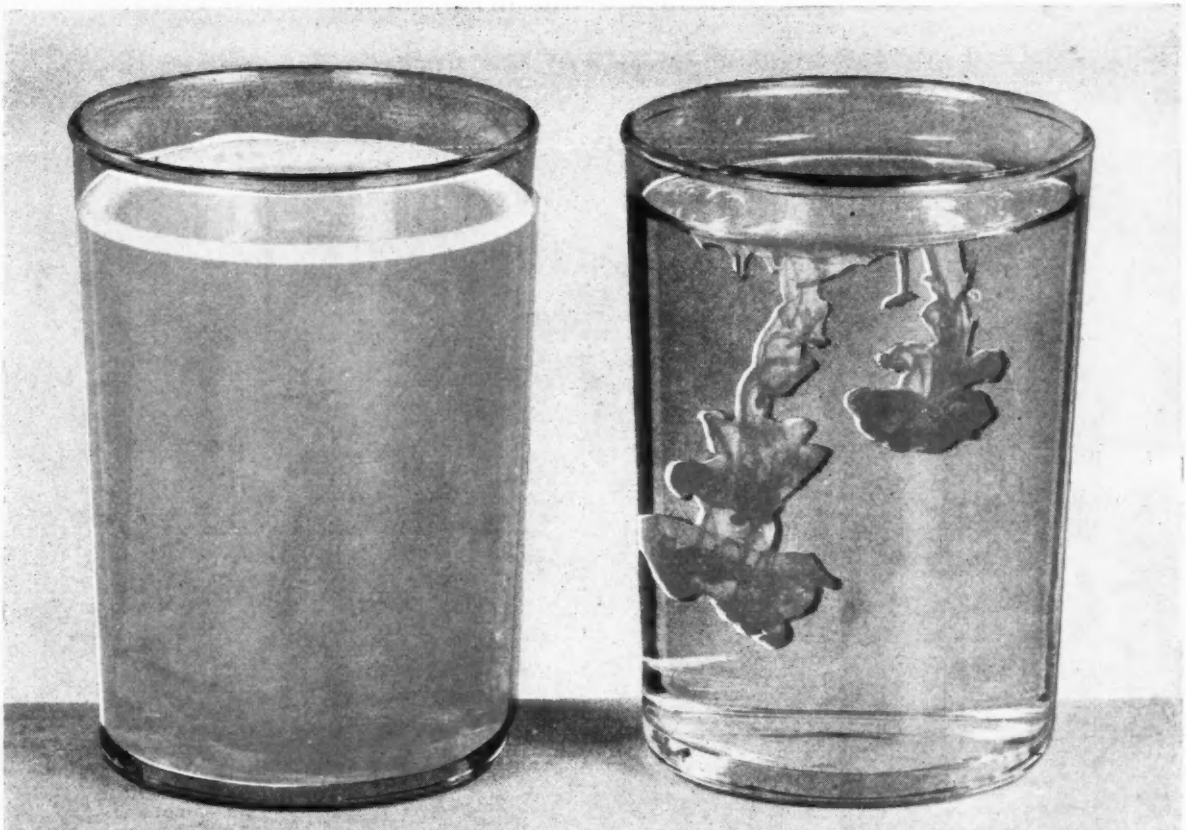
ASHLAND, MASSACHUSETTS

549 West Randolph St., Chicago, Ill. • 635 Drexel Bldg., Philadelphia, Pa. • 115 S.W. Fourth Ave., Portland, Ore.

304 E. Moorehead St., Charlotte, N. C.

CANADIAN AGENTS:

Charles Albert Smith Limited, 123 Liberty St., Toronto, Canada



Improved SANTOMERSE No. 1

penetrates *FAST* ...spreads *THOROUGHLY*

Santomerse No. 1 has achieved wide use in textile dyeing operations because of its fast penetration and thorough spreading action, which are graphically illustrated in the photograph above... The right-hand glass contains water only, the water at the left contains a small amount of Santomerse No. 1. A drop of color added to each shows the quicker, more complete dispersion attained in the Santomerse No. 1 solution.

By breaking down the surface tension of water, Santomerse No. 1 provides the leveling effect needed in dye baths. It can be used prior to dyeing to wet out thoroughly and to assist penetration, or can be added directly to the dye bath... Because of its high detergency value and ease of rinsing, Santomerse No. 1 is also an excellent scouring agent for all fibres.

For complete information on Santomerse No. 1 applications in the textile and dyeing fields, send for application Data Bulletin No. P-118. Write to MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri, or simply return the coupon. District Sales Offices: New York, Philadelphia, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Limited, Montreal.

Santomerse; Reg. U. S. Pat. Off.

MONSANTO CHEMICALS

MONSANTO CHEMICAL COMPANY
Phosphate Division
1700 South Second Street, St. Louis 4, Missouri

ADP-2

Please send a copy of Application Data Bulletin No. P-118 on Santomerse No. 1 to:

Name_____ Title_____

Company_____

Address_____

City_____ State_____

SERVING INDUSTRY... WHICH SERVES MANKIND

Olate BRINGS OUT THE BEST IN YOUR SYNTHETICS

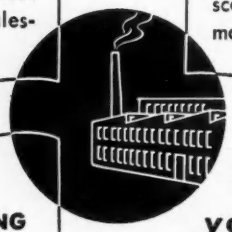
● If synthetic processing is your responsibility, let Olate shoulder part of the load. Olate has a time-tested reputation for exceptional wetting out, detergent and lubricating qualities. This pure, neutral, low titer soap is widely used throughout the industry because of its efficiency, economy, and safety. No other soap can do more to help you turn out quality yarns, hosiery, knitted fabrics or woven piece goods.

FOR YARN FINISHING

You get thorough scouring with Olate . . . rinsing is fast and complete . . . protection against oxidation, rancidity, and odor development is exceptional. Olate-scoured yarns give fabrics the pleasing finish which means so much to the eye-appeal and sales-appeal of the finished product.

FOR HOSIERY SCOURING AND DYEING

Cleansing action starts the minute Olate's fluid solutions penetrate the hosiery. Wetting out is fast and thorough. You get unusual freedom from uneven dyeing with Olate scouring. And Olate costs you far less than most proprietary scouring oils.



FOR SCOURING AND DYEING WOVEN PIECE GOODS AND KNITTED FABRICS

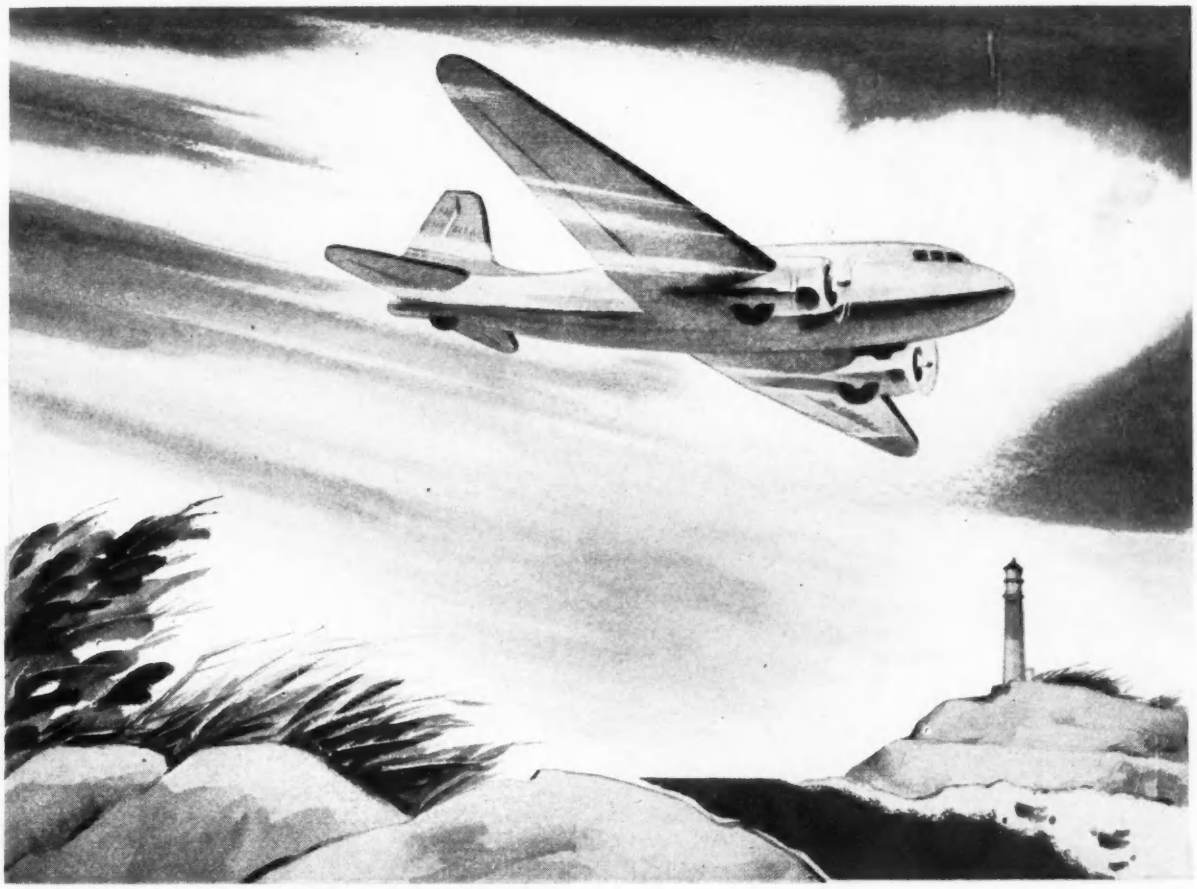
Olate provides exceptional freedom from these common trouble makers—uneven shrinkage, streaks, dye blotches, and chafe marks—because of its rapid wetting out, gentle cleansing action, and excellent lubricating properties. Olate can do much to guard against costly, wasteful tie-ups and rejects.

there's a place in your plant where Olate can help . . . try it!

Olate

Safe and efficient for every soap usage.

● PROCTER & GAMBLE ●



Flying with a tail wind

Planes take off in almost any kind of weather these days—but every pilot welcomes good flying conditions and a tail wind. That's what makes it easy to fly on or ahead of schedule.

In the same way, bleachers and dyers prize a de-sizing agent that gets the job done on time—makes finishing operations easy—overcomes snags and helps avoid "problem lots."

Take Type L—for instance: here's a Diastafor brand de-sizing agent that is "tops" for easy, economical, trouble-free operation. Yard after yard, you get a fine "hand" in your finished goods. You're "flying with a tail wind" all the time when you use Diastafor.

Diastafor—Type L—has been especially developed to work in a wide range of temperatures and pH. Over and over again it has proved itself on the most difficult de-sizing jobs, giving the same uniformly good results.

Whether you are working with cottons, rayons, or mixed goods—you can depend on Diastafor to give a good finish—no impairment of tensile strength, no streaky or uneven dyeing.

In addition to Type L, Diastafor is available in several other types, to meet any de-sizing problem. If you would like to know more about Diastafor, the favorite de-sizing agent for 40 years, we shall be glad to send you full information and prices. Just write Standard Brands Incorporated, *Diastafor Department*, 595 Madison Avenue, New York 22, New York.

DIASTAFOR

A TRADE MARK OF STANDARD BRANDS INCORPORATED

LOCUST BEAN GUM

THE BEST QUALITY IN THE WORLD
IS IDENTIFIED BY THIS TRADE-MARK

FOR

PRINTING • SIZING • FINISHING

COTTON • WOOL • RAYON

Originated and produced since 1930 by

S. A. Cesalpinia — M. Hefti & Company

MILANO

Via Felice Casati — 44

FACTORIES:

Milano — Bergamo — Siralusa — Napoli

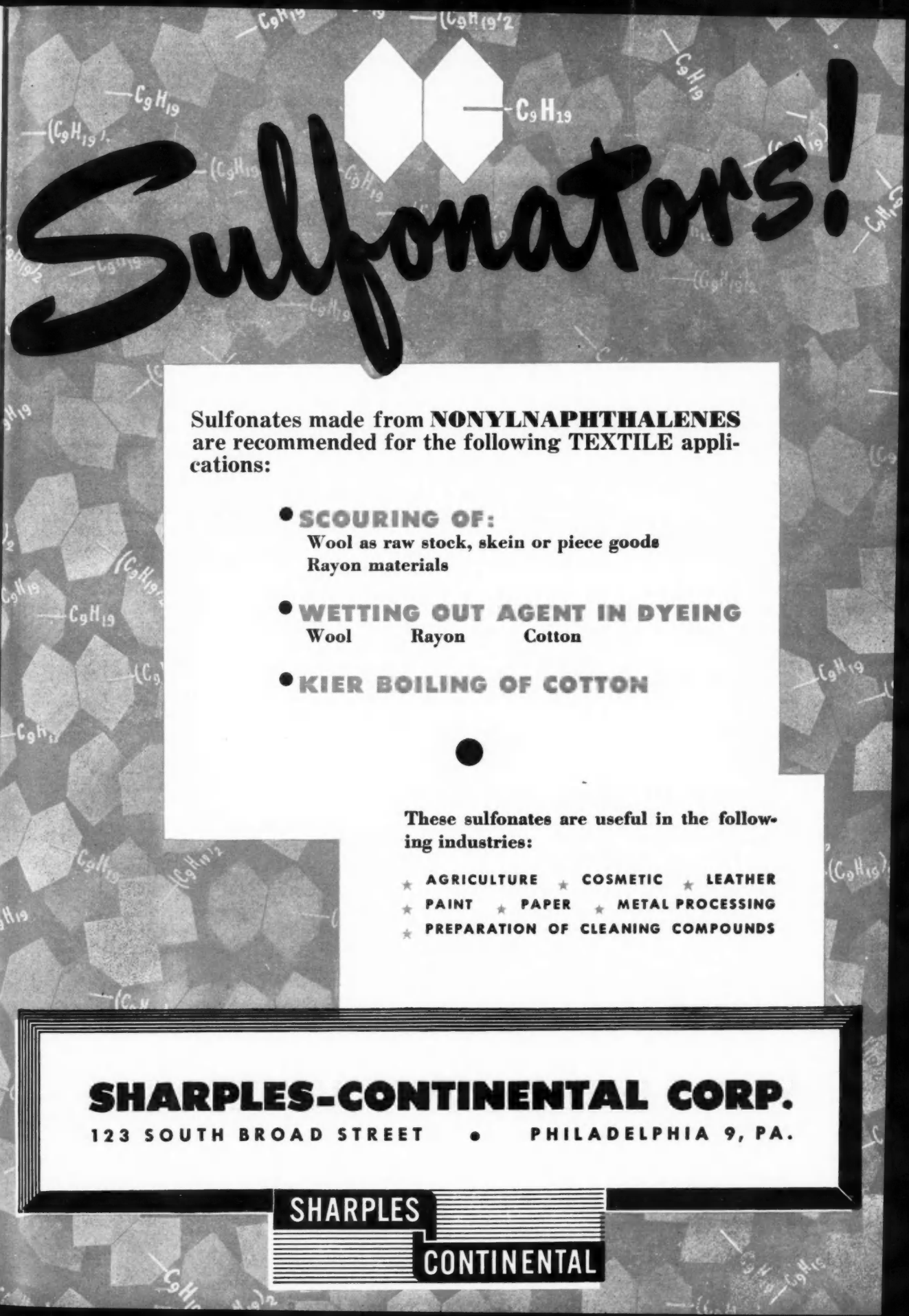
Pozzallo — Rosolini

THE VERY BEST IN QUALITY—THE TRADE MARK OF THE LOCUST TREE

U. S. AGENTS

DUVEKOT & CO., 92 Liberty St., New York City

Telephone — WOrth 2-3125


Sulfonators!
Sulfonates made from NONYLNAPHTHALENES are recommended for the following TEXTILE applications:
• SCOURING OF:
Wool as raw stock, skein or piece goods
Rayon materials
• WETTING OUT AGENT IN DYEING
Wool Rayon Cotton
• KIER BOILING OF COTTON
These sulfonates are useful in the following industries:
★ AGRICULTURE ★ COSMETIC ★ LEATHER
★ PAINT ★ PAPER ★ METAL PROCESSING
★ PREPARATION OF CLEANING COMPOUNDS
SHARPLES-CONTINENTAL CORP.
123 SOUTH BROAD STREET • PHILADELPHIA 9, PA.
SHARPLES
CONTINENTAL

Pharmasols
For Bright Reds and Scarlets

PHARMASOL Scarlet RR Conc.
PHARMASOL Scarlet SNN
PHARMASOL Red GNBS
PHARMASOL Red RN and
PHARMASOL Red GNN

are the outstanding members of the group of azoic colors producing full and bright Reds and Scarlets of excellent fastness at a low cost.

PHARMASOLS are stabilized solutions, adjusted to the most practical concentration, which can be easily applied with a maximum of efficiency. As they do not decompose they overcome the problem of troublesome dissolving.

Indigosols
For Pink Shades of Good Fastness

INDIGOSOL Pink IR EXT, and
INDIGOSOL Scarlet HB

are two products in this soluble vat color group which are unexcelled for the production of pink shades of good fastness. They are unequalled, in the fast color group, for ease of application, clearness of tone and the solidity of color in any depth. They can be printed, padded, or dyed on any textile fibre.

All INDIGOSOLS are readily soluble, easily developed and economical to use.

CARBIC COLOR AND CHEMICAL CO., INC.

451-453 Washington Street, New York City

BRANCHES:
PHILADELPHIA
PROVIDENCE HAMILTON, ONT.
CHARLOTTE, N. C.

IMPORTERS OF THE MANUFACTURES OF DURAND & HUGUENIN S. A. BASLE, SWITZERLAND

EXCLUSIVE DISTRIBUTORS OF
PHARMASOLS
PHARMOLS
PHARMACINES

Representative: Los Angeles (Hathaway Allied Products)

AMERICAN

DYESTUFF REPORTER

LOUIS A. OLNEY, D.Sc
Directing Editor

NORMAN A. JOHNSON, B.T.C.
Managing Editor

MYRON D. REESER
Advertising Manager

GRACE B. BURTON
Production Manager

M. H. MORGAIN
Circulation Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

•

Published every other Monday by
HOWES PUBLISHING COMPANY, INC
One Madison Avenue, New York 10, N. Y.

A. P. HOWES
President

C. R. HOWES
Vice President

H. F. CRAWFORD
Treasurer

M. D. REESER
Secretary

C. ESSENBREIS
Asst. Secretary

•

Also Publishers of
KNIT GOODS WEEKLY
TEXTILE COLORIST
AND CONVERTER
HOSIERY MERCHANDISING

•

February 9, 1948

VOLUME 37 NUMBER 3

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index at your library

• Special Articles

Determination of the Rate of Water Absorption of Light-Weight Cotton Fabrics 73
James H. Kettering

Comparison of Two Current Test Procedures for Testing Fabric Resistance to Atmospheric Gas Fading 76
Frances Karr Ray

• Departments

Book Reviews 80
Abstracts 101
Patent Digest 103
Paul Wengraf
Trade Notes—New Products 105

• Proceedings of the American Association of Textile Chemists and Colorists

Membership Applications P81, P100
Experimental Studies of Vat Dyeing..... P82
O. W. Clark
Research Activities P91
February 28th Meeting, Mid-West Section..... P91
Western New England Section..... P91
Calendar P91
Photo, Annual Banquet..... P92
Non-Cellulosic Fibers Group Meeting:
Wool Piece Goods Scouring with a Synthetic Organic Detergent P93
O. M. Morgan
Scouring Wool Raw Stock with a Synthetic Organic Detergent P96
O. M. Morgan
J. Robert Bonnar Elected Chairman, Research Committee P99
Meeting, LTI Student Chapter..... P99
Meeting, Philadelphia Section..... P99
Meeting, PTI Student Chapter..... P99
Communication P100
To Hold Annual Meeting in Augusta, Ga.....P100
Dahlen and Theel on Executive Committee on Research P100
Employment Register P100

Copyright, 1948, Howes Publishing Co., Inc.

RAPIDASE
for de-sizing

The dependable, rapid and economical de-sizing agent for cottons, rayons and mixed goods. Applicable over a wide range of processes, temperatures and speeds.

HAS PROVED PARTICULARLY SUITABLE FOR CONTINUOUS DE-SIZING

WALLERSTEIN COMPANY, INC. • 180 MADISON AVENUE • NEW YORK 16, N. Y.

AMERICAN
DYESTUFF REPORTER

VOLUME 37 FEBRUARY 9, 1948 NUMBER 3

Determination of the Rate of Water Absorption of Light-Weight Cotton Fabrics

JAMES H. KETTERING
Southern Regional Research Laboratory[1]
New Orleans, Louisiana

Abstract

A rapid method using simple equipment has been developed for determining the rate of water absorption of light-weight cotton fabrics. The method consists essentially of determining the time required for a disc of test fabric to absorb a measured volume of water from the surface of a porous plate.

Introduction

ALTHOUGH the quality and general utility of many cotton fabrics depends on their ability to absorb water, no one method for measuring this important property has as yet been generally accepted as truly satisfactory by either research workers or practical mill men. The general practice has been for each mill to develop its own procedure, which frequently leaves something to be desired from the standpoint of accuracy, and can hardly be expected to yield consistent or comparative figures. Research laboratories have either paid relatively little attention to absorbency, or have been content with methods *(1, 2, 3, 7, 10)* very little better than those used in the mill laboratories. The absorbency methods that have been investigated and compared *(4, 5, 9)* are applicable, for the most part, only to towels and other highly absorbent fabrics.

The purpose of the present article is to suggest a new approach to the problem of measuring the rate of water absorption. A method is proposed which, while not yet adapted for use on terry toweling, can be used on sheeting, shirting materials, print cloth, and other light-weight fabrics as well as on some of the heavier and more absorbent fabrics such as huck and crash toweling. The manipulative techniques are easily learned and the whole test takes from 5 to 10 minutes.

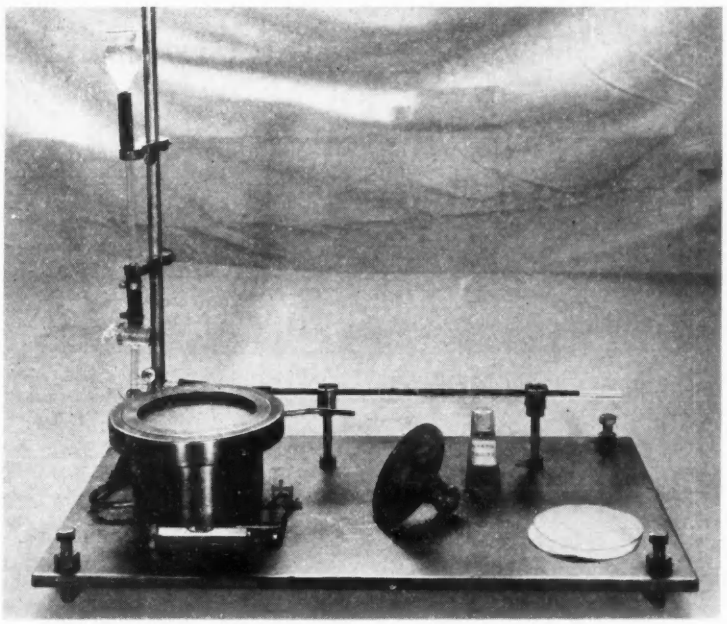


Figure 1. Water Absorbency Apparatus

The Apparatus

The apparatus (Figure 1) is a hollow cylindrical brass vessel, 4 inches in diameter and 3¼ inches in height with a ledge at the top of which rests a porous plate. The latter is of medium porosity Alundum, 3/16 inch thick and 5 inches in diameter. Resting upon the plate and holding it firmly in position is a brass ring ⅜ inch thick, ½ inch wide and having an inner diameter of 4 inches. A small piece of copper tubing extends through the wall of the cylinder near the bottom and serves as a water inlet. To this tubing is attached a 7-mm glass tube having a side arm and stopcock connected to a thistle tube.

[1] One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

Attached to the side arm by means of rubber tubing is a capillary (2-ml measuring pipette with its tip cut off) graduated into tenths of a milliliter.

Another copper tube which passes through the walls of the vessel just beneath the porous plate, its outer end extending a few inches beyond the walls of the vessel, permits the escape of air bubbles from beneath the porous plate and controls the water level. An analytical or sensitive torsion balance, stop watch, template, set of noncorrosive 3½-inch circular weights, a flask, and two beakers complete the apparatus.

This apparatus is similar to the one used by Rees (*8*) for investigating rate of evaporation of water from a plane surface but differs from it in the manner of holding the porous plate in place, applying the sample and the size of the weights placed on the sample. Moreover, a standard air current is not required.

Calibration

In practice, as the water is absorbed from the surface of the porous plate, water flows from the capillary tube into the brass vessel. Calibration of the apparatus consists of adjusting the size and position of the capillary, so that the weighed quantity of water absorbed from the surface of the porous plate equals the measured quantity indicated by movement of the meniscus along the capillary which has been previously calibrated for volume. The bore of the capillary must be small enough to retain a meniscus and large enough to allow free flow of the water. Three millimeters proved to be the best diameter for these purposes. Two milliliter measuring pipettes, with their tips cut off, make quite satisfactory capillary tubes. Such pipettes are available at chemical laboratory supply houses.

Absorbency values will be lowered gradually unless the porous plate is cleaned at frequent intervals with chromic acid, concentrated sulfuric acid, or some similar reagent.

Procedure

Before making absorbency measurements: (1) fill the apparatus with water until the level is at the top of the porous plate; (2) be sure the apparatus is exactly level, that the pipette is supported horizontally at (or slightly below) the level of the porous plate; (3) be sure that the stopcock is closed; and (4) be sure that the system is in equilibrium.

Cut specimens (preferably ten) from the fabric to be tested using the 3½-inch template. Weigh all the specimens together and record their total weight. (A torsion balance reading to hundredths of a gram is satisfactory for this purpose). Assume that each specimen weighs its fractional share of this weight. For ten specimens, this would be 1/10.

Choose the circular weight which is heavy enough to hold the entire surface of the sample in contact with the porous plate during the test but not heavy enough to deform it excessively, and attach a sample to it with a thin film of just enough Canada balsam to hold the fabric in place. The weight applied to the sample must be great enough to press the sample smoothly and firmly on the surafce of the porous plate and not great enough to retard absorption. The effect of weight applied is shown in Table 1. Weights which are too heavy give high absorbencies while weights which are too light give low results. A 420-gram weight has been found best for most fabrics.

By opening the stopcock and allowing the water *to flow in slowly*, adjust the meniscus to the zero point of the pipette. Place the weight with the attached sample on the porous plate, starting a stop watch at the same instant. When the meniscus reaches the 0.2 ml mark stop the watch and remove the weight with attached sample from the porous plate. Record the time taken to absorb the 0.2 ml. Repeat for each of the specimens. The absorbency (A) is calculated:

$$A = \left[\frac{W}{T} \times K\right] \div S$$

where W is the water absorbed in grams, T is the time required for absorption in seconds, S is the average weight of sample in grams, and K is a constant required to adjust the values to convenient magnitudes. In the work here reported, K is 100.

The volume 0.2 ml, recommended in the absorption measurements, was chosen for convenience, since time readings for these volumes can be taken easily. Time readings for volumes of 0.1, 0.3, and 0.4 ml are equally accurate.

Table 1. Effect of weight applied to samples in absorbency measurements

Sample No.	*Weight Applied*	*Time for 0.2 ml*	*Absorbency*
	grams	seconds	
1	100	5.8	3.5
2	192	3.13	6.5
3	291	3.2	6.3
4	391	3.13	6.5
5	601	2.0	10.1

In fact, 0.1 ml absorption will be required for all light-weight fabrics and 0.3, 0.4, or 0.5 will be found more suitable in measuring absorptions of heavier fabrics. Obviously the volumes absorbed must be kept below the point where the time-volume relationship (Fig. 2) ceases to be linear.

It is preferable to make water absorption measurements in an air-conditioned laboratory at 70° F. and 65 percent relative humidity after exposing the fabrics for at least 4 hours. The linear time-volume relationship for water absorptions makes air conditioning unnecessary. Moreover, the relative volume of water (*6*) between 20° and 35° C. 68° to 95° F.) changes only from 1.00177 cc to 1.00598 cc per gram, and since we are dealing with 0.2 ml of water, the error from thermal expansion is negligible at these temperatures. Evaporation from the surface of the porous plate, which amounts to 0.84 ml per hour at 70° F. and 65 percent relative humidity, is slightly higher when the laboratory is not conditioned; but, since the time of test is usually less than 20 seconds, the error from this source is also negligible. Manipulative errors whose magnitude depends on the manual

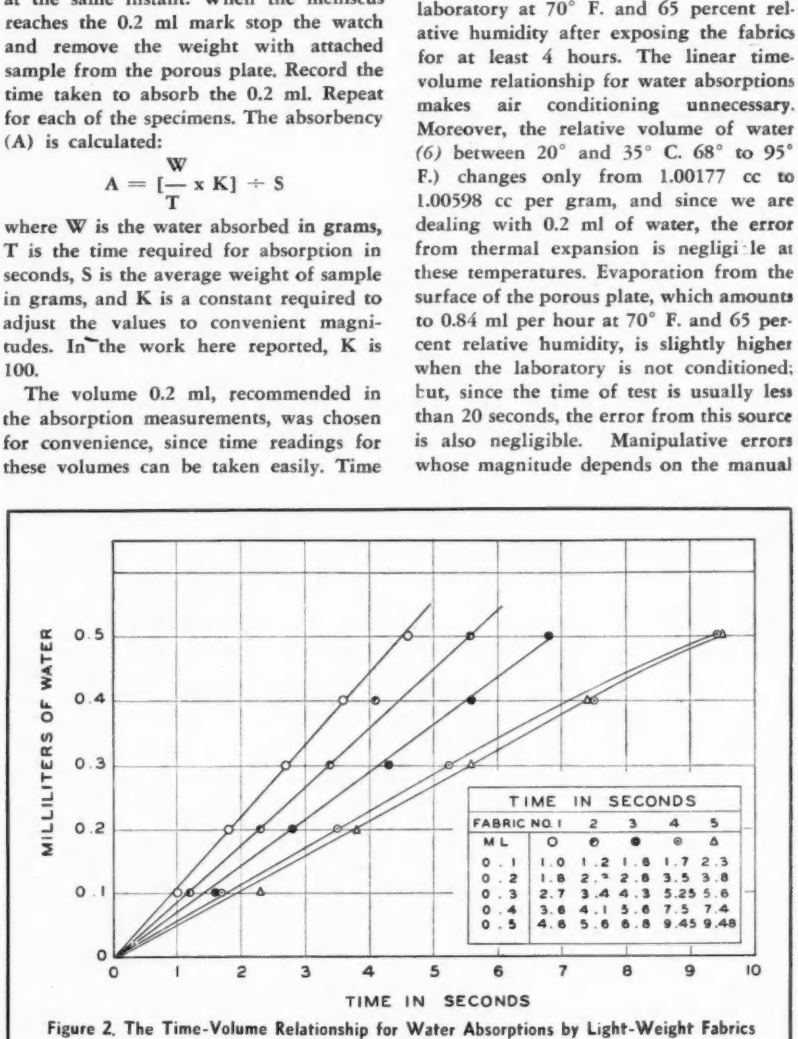


Figure 2. The Time-Volume Relationship for Water Absorptions by Light-Weight Fabrics

dexterity of the operator (for example, in the use of a stop watch) are probably the most serious inaccuracies of the method. Practice will eliminate a number of these. A statistical average of a sufficient number of readings reduces error from this source.

Discussion of Results

The time-volume relationship (Fig. 2) for water absorption was linear for volumes ranging from 0 to 0.4 for all fabrics tested, but curved toward the time axis in some cases for absorption of larger volumes of water. Where rapid absorption occurred in rather heavy fabrics the linear relationship extended up to 1.0 ml.

To test the reproducibility of the method when it is used by different operators five different fabrics representing a considerable range of absorbency were measured by five different operators. The results are given in Table 2. All the operators placed the absorbencies of the fabrics in the same order. For the only three cases (Fabric No. 1, operator No. 1; Fabric No. 4, operator No. 3; and Fabric No. 5, operator No. 4) in which there was any significant difference in the results of the different operators, the measurements were repeated with the second set of results closer in two cases to those of the other four.

A comparison (Table 3) of the suggested method with the widely used "drop square" or "floated sample" (*9*) and capillary rise (*10*) methods for mesauring absorbencies shows little agreement among the three methods. All three detected high and low absorbencies. Among the high absorbencies, the samples appeared in almost random order. But the techniques of the three methods differ widely and the disagreement is perhaps to be expected where the true difference between samples is small as in the first seven values compared in Table 3.

The proposed method probably gives a better evaluation of the absorbency of a fabric than either of the other methods for it tests a larger area of cloth under conditions approaching those of actual service. It also has the advantage of speed, once the apparatus is available. No comparison was made with the Larose method (*7*) or with Haven's "Total Moisture Absorption Method" (*3*), because both of these are adapted to, and recommended for, testing towels, particularly terry towels rather than light-weight fabrics. The apparatus described here has so for been applied only to light-weight fabrics. Adaptation for use on terry toweling, rugs and other heavy and highly absorbent fabrics is contemplated.

Table 2. Water absorbencies determined by different operators on the same fabrics

Fabric:	*No. 1*	*No. 2*	*No. 3*	*No. 4*	*No. 5*
Operator No.					
1	2.8	1.3	5.7	5.0	8.6
2	4.4	1.3	5.4	4.6	8.4
3	4.3	1.2	5.8	6.0	9.3
4	4.4	1.2	4.7	4.4	7.1
5	4.0	1.3	5.2	4.5	8.3

Table 3. Comparison of absorbencies by the proposed method and those of the drop square and capillary rise methods[1]

Sample Number	*Water Absorbency Proposed Method*	*Drop Square Time*	*Capillary Rise in 10 Minutes*
		Seconds	Inches
K542	11.9	3.8	2.37
563	10.7	2.8	3.85
564	10.4	1.6	3.45
569	10.2	3.0	3.75
540	9.5	2.5	3.15
541	7.7	4.8	2.85
570	7.6	2.0	3.25
562	2.5	19.8	2.65
555	1.5	26.5	1.90
554	0.9	14.0	.88
539	.16	Over 30 min.	0
568	.14	Over 30 min.	0

[1] Each recorded figure for the drop square determination is the average of 5 observations. The values for the capillary rise and proposed method are the averages of ten observations.

Summary

A simple, rapid procedure, which approaches conditions of actual service, has been suggested for determining the rate of water absorbency of light-weight fabrics and the necessary apparatus has been described. The method gave fairly reproducible results in the hands of different operators and selected the same fabrics as high and low absorbent as those selected by two comparable methods. The order of those having high absorbencies differed, however. Probably the results obtained with the proposed method evaluate water absorbency more accurately. An attempt will be made to extend the application of the method to other types of fabrics.

Acknowledgment

Appreciation is expressed to E. C. Jackson of Pacific Mills, Lyman, South Carolina, for his interest in this work and for helpful suggestions and criticisms. Mr. Jackson, who has developed a similar apparatus using the same principles, and adapted its use to terry towels, expects to publish his work in the near future.

Literature Cited

(1) Federal Standard Stock Catalogue, Specifications. Nos. CCC-T-571 and DDD-T-511 Approved February 2, 1932.
(2) Haven, G. B. "Future Textile Laboratory Practice" Am. Dyestuff Reptr. *19*, 757-761, 782-785 (1930).
(3) Haven, G. B. "Mechanical Fabrics." John Wiley & Sons, New York, N. Y. (1932).
(4) Hess, K. and Readhimer, D. "A Comparison of Methods for Determining the Absorption of Water by Fabrics" J. Home Econ. *26*, 298-303 (1934).
(5) Holland, V. B. "A Comparison of Methods for the Determination of Water Absorbency by Terry Towels" Textile Recorder *61*, (No. 727) 38, 40, 42, (1943).
(6) Lange, N. A. "Handbook of Chemistry, 3rd Ed." (1939) Handbook Publishers, Inc., Sandusky, Ohio.
(7) Larose, P. "The Water Absorption by Towels" Am. Dyestuff Reptr. *31*, 105-108, 123-124 (1942).
(8) Rees, W. R. "Some Experiments on the Evaporation of Water from a Plane Surface" J. Textile Inst. *36*, T165-T168 (1945).
(9) Stevenson, L. and Lindsay, M. "Methods of Testing the Absorption of Water by Cotton Toweling" J. Home Econ. *18*, 193-198 (1926).
(10) Weirick, E. "The Textile Testing Laboratory" Am. Dyestuff Reptr. *21*, 154-159 (1932).

—◆ ◆—

Detergency-Soiling, Storage, and Washing of Cotton Cloth*

WILLIAM P. UTERMOHLEN, Jr., and E. LOUISE WALLACE
Institute of Textile Technology, Charlottesville, Va.

COTTON cloth was treated with dispersions of lampblack, carbon black, or magnetic iron oxide pigment in different oils; the amount of soiling produced by various concentrations of pigment in the soiling dispersions was estimated by measuring the reflectivity of the cloth or determining its iron oxide content. This latter value was found to be directly proportional to the iron oxide content of the soiling dispersion. The reflectivity of soiled cloth was a linear function of the logarithm of pigment content of dispersion:

Log soil in dispersion = —a (% reflectance) ± b (a and b constants).

From this relation, a differential equation was obtained showing that the rate of decrease of reflectivity with increased soiling is proportional to the reciprocal of the amount of soil present. Thus, reflectivity decreases more sharply as soil is added at low soil levels than at high levels.

Soiled cloth was found to be more difficultly washable after storage unless the oils in the soiling mixture were of low iodine number and unless storage conditions were dry. In particular, use of drying oils caused permanent pigment binding. Cloth soiled with mixtures containing various amounts of pigment were given serial washings in a Launder-Ometer. Reflectance measurements indicated that heavily soiled cloth contained a higher amount of permanently held pigment than lightly soiled cloth, and therefore could never be washed as clean by the Launder-Ometer method. In addition, iron oxide analyses showed that some pigment was held by the cloth even after reflectivity measurements of washed cloth equaled that of unsoiled cloth. Because of the presence of this tightly held portion of pigment, theoretical equations for soil removal by washing, based on removal of a given fraction of existing soil in a given washing time, appear to apply only to the loosely bound portios of soil which is removed in the early period of washing.

* Abstract of paper presented at meeting, Division of Cellulose Chemistry, American Chemical Society, New York, N. Y., Sept. 15-19, 1947.

Comparison of Two Current Test Procedures for Testing Fabric Resistance to Atmospheric Gas Fading

FRANCIS KARR RAY*

Ellen H. Richards Institute
The Pennsylvania State College

Introduction

THERE are at present, two standard methods of testing for colorfastness to atmospheric gases of dyes on textile fabrics in current use. The method first formulated was that of the American Association of Textile Chemists and Colorists; this has appeared in the AATCC Yearbook (6) since 1940. The development of this test followed an intensive study by committee members to determine the extent of fading of a sensitive-dyed fabric when suspended for a definite period of time in air containing a quantity of destructive gases (4), which might be encountered under ordinary circumstances. In 1944 those responsible for the Commercial Standard of the National Bureau of Standards relating to woven textile fabrics (CS59-44) adopted a test procedure which was a modified version of the AATCC method, and which required a shorter testing period (1).

It was the purpose of the study herein reported to determine the comparative severity of these two test procedures in terms of color and strength changes produced on fabrics of varying sensitivity.

Methods of Procedure

Apparatus

The gas chamber used in this investigation was built according to a blueprint provided by the American Association of Textile Chemists and Colorists in connection with their tentative standard method of test. It was made of galvanized iron with a glass window in the door; a thermometer was inserted through a hole in the ceiling of the oven. The gases from a lighted Number 3 type of Meker burner entered the chamber at the right side; they were deflected by baffle plates; they were kept in circulation by means of a fan driven by a small electric motor at a speed approximately of 300 R.P.M.; and they were emitted from the oven through an exit pipe fitted with a reducer at the left.

Glass rods which fitted into holes in the baffle plates provided a means for suspending test specimens in the chamber.

Three so-called *"control"* fabrics were used (Fabrics 9, 10, and 11); these consisted of three cellulose acetate satins dyed with three dyes of varying sensitivity, recommended for controls in the 1945 test procedure of the American Association of Textile Chemists and Colorists (6); Control 1 was the most sensitive and Control 3 the most resistant to gas fading of these three fabrics. They were scoured and dyed according to the method prescribed in the American Association of Textile Chemists and Colorists (AATCC) cited above, with the following modifications as recommended by R. Bourrieux, dye chemist of the American Viscose Corporation:

(1) The quantity of water used in the dyebath was 40 instead of 50 times the weight of the dry cloth;

(2) The dyes for Controls 2 and 3 were dissolved first in a small amount of Turkey red oil, and a sulphonated alcohol was used as a substitute for the soap in the dyebath.

Test Fabrics

Fourteen colored rayon crepes (one also including some wool) were used as the experimental fabrics. These represented both regenerated and viscose rayons in the filament and spun types.

The fiber content and dye type of each of these experimental fabrics are shown in Table I. The dyes used on the fabrics were identified by chemical tests. The procedure given by Green (2) supplemented by private advice from Charles A. Seibert of the E. I. du Pont de Nemours & Company, and Arthur Wachter of the American Viscose Corporation for the identification of dye types was followed.

Preparation of Specimens

The size of the test specimens was sufficient to allow for reflectometer readings and bursting strength measurements after exposure. Two specimens of each fabric were exposed at the same time for each method of procedure. They were cut five inches wide, five and three-fourths inches long, and were finished with hems at both ends (for inserting glass rods) to a length of four and one-half to four and five-eighths inches. The function of the glass rods inserted in a hem at the bottom of the specimens was to prevent extreme agitation of the fabrics by the fan and to permit more uniform distribution of the gases.

A preliminary study conducted to determine conditions necessary for the most uniform fading throughout the oven indicated that a maximum of six test fabrics should be exposed at one time, in addition to the control strip used in determining the end-point of the test.

Figure 1 shows the arrangement of the control strip and the specimens inside the gas-fading oven.

Findings

Comparison of the American Association of Textile Chemists and Colorists (AATCC) and Commercial Standard CS59-44 Methods of Testing for Colorfastness to Atmospheric Gases

A Standard of Fading, which consisted of a fabric dyed with fast dyes to a color corresponding to that which Control Number 1 became after nine months of exposure in air containing a quantity of oxides of nitrogen found under ordinary conditions according to Seibert (4) was used for comparative purposes in both test procedures in order to determine the end-point of the test. A strip of Control Number 1 was exposed along with the other specimens when making each test. The gas flame was adjusted so that the oven temperature did not exceed 140° F.

The major difference in the two test procedures, namely—that of the American Association of Textile Chemists and Colorists and that of the Commercial Standard of the National Bureau of Stand-

* Deceased March 1, 1947.

TABLE I—Dye identification of the experimental fabrics

Fabrics	Fiber Content	Dye Type
1. Blue Twalle Background:		
Blue	Viscose rayon (filament)	Direct
Printed design:		
Black		Thioindigoid vat
Gray		Thioindigoid vat
Rose		Anthraquinone vat
Yellow		Thioindigoid vat
Green		Anthraquinone vat
2. Pink Twalle Background:		
Rose	Viscose rayon (filament)	Direct
Printed design:		
Gray		Thioindigoid vat
Black		Thioindigoid vat
3. Blue Gabardine	Viscose rayon (spun)	Direct
4. Tan Gabardine	Cotton and viscose rayon (spun)	Anthraquinone vat
5. Red Salyna	Cotton and viscose rayon (spun)	Diazo and Developed
6. Pink Tricot	Cellulose acetate rayon (filament)	Direct on Acetate Rayon
7. Chartreuse Taffeta	Cellulose acetate rayon (filament)	Direct on Acetate Rayon
8. Light Blue Satin	Cellulose acetate rayon (filament)	Direct on Acetate Rayon
9. Control 1	Cellulose acetate rayon (filament)	Direct on Acetate Rayon (Celanthrene Brilliant Blue FFS)
10. Control 2	Cellulose acetate rayon (filament)	Direct on Acetate Rayon (Eastone Blue BB)
11. Control 3	Cellulose acetate rayon (filament)	Direct on Acetate Rayon (Setacyl Direct Blue GD)
12. Green Crepe	Viscose and cellulose acetate rayon (filament)	Direct
13. Blue Crepe	Viscose and cellulose acetate rayon (filament)	Direct
14. Violet Faille	Viscose and cellulose acetate rayon (spun), and wool	Direct

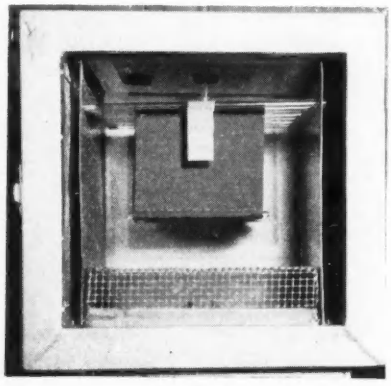


Fig. 1
Arrangement of Specimens Inside Gas-Fading Oven.

ards, lies in the determination of the end-point of the exposure period and the treatment of the specimens thereafter.

According to the CS59-44 procedure, the exposure period is completed when the control, after being removed and placed for 20 seconds under a flatiron heated to 210°-230°F. (99-110° C.), shows a complete change of color corresponding to that of the Standard of Fading mentioned. All specimens are then removed, given the treatment mentioned above, and allowed to lie in the air for 15 minutes before comparison with unexposed portions are made.

According to the AATCC procedure, the test is not completed until the control shows a complete change of shade corresponding with that of the Standard of Fading. Because of the fact that the shade of the control is not always the same, tending to become more gray in moist air and more reddish in dry air, a confirmatory heat test (5) is offered to aid the observer in determining when the end-point has been reached. This consists in giving the control a heat treatment similar to that used in the CS59-44 method, followed by comparison with shades from the Munsell Book of Color or the Standard Color Card. The test specimens are not given this supplementary heat treatment.

For comparison of the two test procedures, specimens of each fabric in the original state were subjected to one test period according to each method. The effects on color (as evaluated visually and by means of the reflectometer), and on wet bursting strength were compared.

Determination of Color Changes

Visual Evaluation

Original and exposed specimens were placed on a gray mounted board (45° angle) in a black cabinet under a light having a color temperature of 2780° K. In this arrangement, the eyes of the observer are approximately at right angles to the specimens, and the light shines from one side at an angle of about 30° from the line of vision of the observer.

Fabrics when judged visually for color change, were classified as follows:

Class I. No observable fading;

Class II. Only slight fading;

Class III. Some fading, but not sufficient to render a garment unfit for further use;

Class IV. Severe fading, sufficient to render a garment unfit for further use.

Standard sets of faded swatches of different colors were used in an effort to maintain as close uniformity as possible in making judgments.

Reflectometer Readings and Color Difference Calculations

Reflectometer readings were determined on the fabrics of solid color by the use of the Hunter Reflectometer, Number 518. Readings were made with the green (5,500 ± 1,000 A.U.), amber (5,950 ± 1,000 A.U.), and blue (4,500 ± 1,000 A.U.) filters on four different areas of an original and an exposed specimen for each set of color difference calculations. It was found essential to make readings on the original at the same time as on an exposed specimen, because of mechanical fluctuations in the reflectometer from day to day.

The instrument was standardized by means of a porcelain or gray plate, depending upon the original reflectance of the unexposed original fabric.

Measurement of the amount of color difference then was calculated by the following formula proposed by Hunter for use with this instrument *(3)*.

Derivation of this formula was based on Judd's empirical equation for ΔE, the approximate amount of perceived color difference.

As a basis for determining the significance of units of color change for a given fabric, determinations of color differences among three different areas of the original were made. The highest and lowest differences found are recorded for each fabric, which showed measurable color differences after exposure.

Wet Bursting Strength Measurements

Bursting strength measurements were made by the use of the Mullen motor-driven tester. Five wet bursting strength measurements were made on each exposed fabric.

Presentation of Data

Visual ratings of the American Association of Textile Chemists and Colorists results as compared with those of the Commercial Standard CS59-44 are given in Table II. Reflectometer readings and units of color difference are given in Table III and presented graphically in Figure 2. Wet bursting strength measurements expressed in pounds and in percentages of change from the original are recorded in Table IV, and are presented graphically in Figure 3.

TABLE II—Comparison of one AATCC period of exposure with one CS59–44 period of exposure in effect on color as evaluated by visual inspection

Fabrics	One Period—AATCC Method Description of Color Change	*Rating (Class)
1. Blue Twalle		
Blue	no change	I
Black	no change	I
Gray	no change	I
Rose	no change	I
Yellow	no change	I
Light green	no change	I
Dark green	no change	I
2. Rose Twalle		
Rose	slightly yellowish	II
Light gray	no change	I
Dark gray	no change	I
Black	no change	I
3. Blue Gabardine	no change	I
4. Tan Gabardine	no change	I
5. Red Salyna	no change	I
6. Pink Tricot	lighter, yellowish	III
7. Chartreuse Taffeta	no change	I
8. Light Blue Satin	no change	I
9. Control 1	dull blue-violet	IV
10. Control 2	slightly lighter, grayed	II
11. Control 3	no change	I
12. Green Crepe	yellowish	IV
13. Blue Crepe	much duller, slightly purple	IV
14. Violet Faille		
a. Satin side	pinkish	IV
b. Dull side	pinkish	III

*Class I good
Class II fair
Class III poor
Class IV very poor

TABLE II—*Continued*

Fabrics	One Period—CS59 Method Description of Color Change	*Rating (Class)
1. Blue Twalle		
Blue	slight violet cast	II
Black	no change	I
Gray	no change	I
Rose	no change	I
Yellow	no change	I
Light green	no change	I
Dark green	no change	I
2. Rose Twalle		
Rose	less yellow than AATCC specimen	II
Light gray	no change	I
Dark gray	no change	I
Black	no change	I
3. Blue Gabardine	no change	I
4. Tan Gabardine	no change	I
5. Red Salyna	no change	I
6. Pink Tricot	lighter; less yellow than AATCC specimen	II
7. Chartreuse Taffeta	no change	I
8. Light Blue Satin	very slightly duller	I
9. Control 1	pinker than AATCC	IV
10. Control 2	lighter, grayed, slightly pinkish	II
11. Control 3	no change	I
12. Green Crepe	less yellowish than AATCC specimen	III
13. Blue Crepe	definitely purple, less dull than AATCC specimen	III
14. Violet Faille		
a. Satin side	pinkish	IV
b. Dull side	less pinkish than AATCC specimen	III

Discussion of Findings

Color Changes

As evaluated visually and recorded in Table II, the classifications of color changes after one period of exposure by each of the two methods were the same in the majority of cases; only in four out of 24 cases were the ratings different. The blue background of the Blue Twalle (fabric number 1) took on a slight violet cast after the CS59-44 test, with a rating of Class II. After the AATCC test, on the other hand, it showed no change and received a rating of Class I. The Pink Tricot (fabric number 6), the Green Crepe (fabric number 12), and the Blue Crepe, (fabric number 13), however, showed more fading and received lower ratings after the AATCC than after the CS59 test. The Rose Twalle, the Light Blue Satin, Control 1, Control 2, and the Violet Faille (fabrics 2, 7, 8, 9, and 14, respectively) received the same ratings by the two methods; but color changes within these ratings were slightly different.

As indicated by reflectometer readings and units of color difference recorded in Table III and shown graphically in Figure 2 ,the AATCC test was more severe in five cases and the CS59 test in seven cases. Considering as significant only those in which the difference between the units of change for the two methods was greater than the highest units of variation found in different areas of the original fabrics before exposure, there were six cases out of 13 in which the two test procedures did not give comparable results. Of these, the Blue Crepe (fabric number 13) and the Violet Faille (fabric number 14)—on both satin and dull sides—showed more units of color change after the AATCC test, while the Blue Gabardine (fabric number 3), the Red Salyna (fabric number 5), and Control 2 (fabric number 10), showed more change after the CS59 exposure.

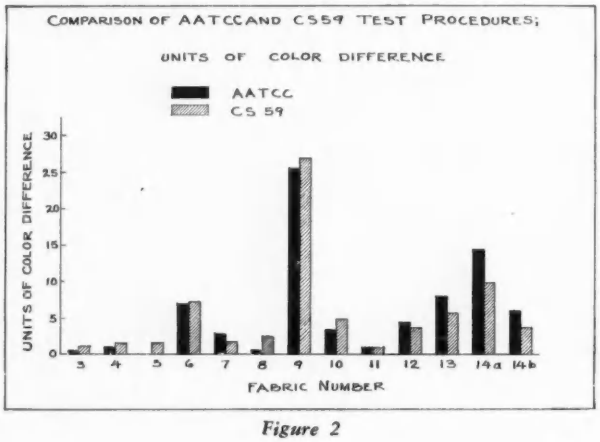


Figure 2

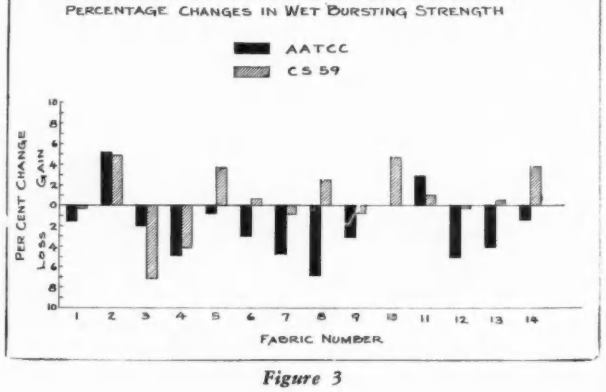


Figure 3

TABLE III—Comparison of one AATCC period of exposure with one CS59–44 period of exposure in effect on color as evaluated by reflectometer readings and units of color difference

Fabrics	Per Cent Reflectance Original Blue	Original Amber	Original Green	Exposed Blue	Exposed Amber	Exposed Green	Units of Color Difference	Difference in Units of Color Difference Between Three Unexposed Areas Low	Difference in Units of Color Difference Between Three Unexposed Areas High
One Period—AATCC Method									
1. Blue Twalle	Multiple Print—Could not be read								
2. Rose Twalle	Multiple Print—Could not be read								
3. Blue Gabardine	30.3	22.9	24.2	30.2	22.7	24.1	0.5	0.0	0.0
4. Tan Gabardine	26.2	50.2	42.7	26.2	50.4	42.6	1.1	0.0	0.6
5. Red Salyna	4.1	22.9	9.2	4.1	22.9	9.2	0.0	0.0	0.8
6. Pink Tricot	39.9	82.7	65.3	43.2	83.2	67.9	7.0	0.6	3.2
7. Chartreuse Taffeta	23.2	72.8	66.1	24.9	75.0	68.5	2.8	1.2	1.7
8. Light Blue Satin	55.6	68.8	65.9	56.2	68.8	65.9	0.6	1.0	3.1
9. Control 1	55.6	17.3	22.6	41.5	21.2	22.7	25.4	0.5	2.8
10. Control 2	43.5	20.8	22.6	43.0	21.8	23.4	3.4	0.5	1.0
11. Control 3	39.4	18.7	21.8	39.1	18.5	21.8	1.0	0.0	0.0
12. Green Crepe	10.0	14.2	14.6	9.6	15.5	15.6	4.4	0.0	0.9
13. Blue Crepe	8.4	5.2	4.8	6.9	5.4	5.0	7.9	0.0	2.0
14. Violet Faille									
a. Satin side	28.7	19.5	17.4	25.7	23.1	19.5	14.4	0.9	1.4
b. Dull side	25.2	18.5	16.5	23.9	19.7	17.1	5.9	0.0	0.9
One Period—CS59 Method									
1. Blue Twalle	Multiple Print—Could not be read								
2. Rose Twalle	Multiple Print—Could not be read								
3. Blue Gabardine	30.3	22.9	24.2	31.3	23.0	24.5	1.1	0.0	0.0
4. Tan Gabardine	26.2	50.2	42.7	27.0	50.4	42.9	1.5	0.0	0.6
5. Red Salyna	3.7	22.4	9.9	3.7	22.8	10.0	1.6	0.0	0.8
6. Pink Tricot	47.8	77.0	63.8	53.1	78.5	67.2	7.2	0.6	3.2
7. Chartreuse Taffeta	23.2	72.8	66.1	24.5	73.6	66.8	1.7	1.2	1.7
8. Light Blue Satin	55.6	68.8	65.9	56.1	68.7	65.2	2.5	1.0	3.1
9. Control 1	55.6	17.3	22.6	41.6	21.6	22.2	26.9	0.5	2.8
10. Control 2	43.5	20.8	22.6	42.1	21.9	23.3	4.8	0.5	1.0
11. Control 3	39.4	18.7	21.8	39.6	19.1	22.3	1.0	0.0	0.0
12. Green Crepe	10.2	14.5	14.7	9.9	15.6	15.7	3.7	0.0	0.9
13. Blue Crepe	8.4	5.2	4.8	7.1	5.2	4.6	5.7	0.0	2.0
14. Violet Faille									
a. Satin side	28.0	19.3	17.1	25.9	21.5	18.4	9.9	0.9	1.4
b. Dull side	24.6	18.4	16.3	23.9	19.4	16.9	3.7	0.0	0.9

TABLE IV—Comparison of one period of exposure by the AATCC method with one period by the CS59–44 method in effect on wet bursting strength

Fabrics	Original Strength (Pounds)	Strength after Exposure (Pounds)	Gain or Loss Pounds	Gain or Loss Per cent
One Period—AATCC Method				
1. Blue Twalle	33.1	32.6	−0.5	−1.5
2. Rose Twalle	39.1	41.1	+2.0	+5.1
3. Blue Gabardine	58.0	56.8	−1.2	−2.0
4. Tan Gabardine	75.4	71.7	−3.7	−4.9
5. Red Salyna	60.9	60.4	−0.5	−0.8
6. Pink Tricot	26.8	26.0	−0.8	−3.0
7. Chartreuse Taffeta	43.6	41.5	−2.1	−4.8
8. Light Blue Satin	45.8	42.7	−3.1	−6.8
9. Control 1	38.8	37.6	−1.2	−3.1
10. Control 2	37.0	37.0	0.0	0.0
11. Control 3	38.1	39.2	+1.1	+2.9
12. Green Crepe	35.6	33.8	−1.8	−5.1
13. Blue Crepe	36.6	35.1	−1.5	−4.1
14. Violet Faille	67.0	66.9	−0.1	−1.5
One Period-CS59-44 Method				
1. Blue Twalle	33.1	33.0	−0.1	−0.3
2. Rose Twalle	99.1	41.0	+1.9	+4.9
3. Blue Gabardine	58.0	53.9	−4.1	−7.1
4. Tan Gabardine	75.4	72.3	−3.1	−4.2
5. Red Salyna	60.9	63.1	+2.2	+3.6
6. Pink Tricot	26.8	27.0	+0.2	+0.7
7. Chartreuse Taffeta	43.6	43.2	−0.4	−0.9
8. Light Blue Satin	45.8	46.9	+1.1	+2.4
9. Control 1	38.8	38.5	−0.3	−0.8
10. Control 2	37.0	38.7	+1.7	+4.6
11. Control 3	38.1	38.5	+0.4	+1.0
12. Green Crepe	35.6	35.5	−0.1	−0.3
13. Blue Crepe	36.6	36.8	+0.2	+0.5
14. Violet Faille	67.0	69.5	+2.5	+3.7

In the case of the Pink Tricot, the discrepancy between the comparison on the basis of color difference units with that on the basis of visual judgment ratings may be attributed at least partially to the fact that the best treatment given as part of the CS59 procedure increased the luster of the fabric, thus increasing its reflectancy and the calculated units of color difference. The actual color change involved was only part of this difference.

In general, the tendency was for fabrics that were sensitive to gas fumes to fade more severely with the AATCC method, and for those that were more resistant to show a greater degree of change with the CS59-44 method. Some of the dyed fabrics showed color changes (usually temporary) as a result of the heated iron alone.

Strength Changes

Changes in wet bursting strength as given in Table IV and recorded graphically in Figure 3 show that fluctuations in strength measurements were well under 10 per cent, and therefore were considered insignificant for all of the fabrics exposed according to both methods of test.

Summary and Conclusions

Upon comparing the two current test procedures, the following observations were made:

(1) When visual classifications were compared between fabrics given a gas-fading test according to the procedure of the American Association of Textile Chemists and Colorists (AATCC) and the Commercial Standard (CS59-44), approximately the same results were obtained.

(2) When reflectometer readings and calculated values derived therefrom were employed, differences were slight in the majority of fabrics. In a few fabrics, however, there were distinct differences; these apparently were related to the sensitivity of the dyed fabric to gas fading. The AATCC method tended to be more severe for highly sensitive and the CS59-44 for less sensitive fabrics.

(3) The following potential effects of the heat treatment used as an accompaniment of the CS59-44 technique were noted:

(a) Changes in the luster of the surface of the fabric were found to give misleading results when units of color difference were calculated.

(b) There was a possibility that exposure to the heat of the iron may have caused color changes on fabrics unaffected by gas fumes. Since many fabrics in use are faded upon pressing after they have adsorbed atmospheric gases, the use of heat as a part of the test may be desirable.

(4) Fabric strength was not affected significantly during either method of test.

Acknowledgment

The author is indebted to the director and staff members of The Ellen H. Richards Institute for consultation and assistance during the conduct of the study.

This investigation was conducted under a fellowship maintained at The Ellen H. Richards Institute, The Pennsylvania State College, by The American Viscose Corporation.

This is the first in a series of reports on methodology studies related to gas fading, from the laboratories of the Ellen H. Richards Institute, sponsored by the American Viscose Corp.

Bibliography

1. Commercial Standard CS59-44, "Textiles-Testing and Reporting," U. S. Department of Commerce, National Bureau of Standards (1944).
2. Green, A. G., "The Analysis of Dyestuffs," Charles Griffin and Company, London (1920).
3. Hunter, R. S., "Photoelectric Tristimulus Colorimetry With Three Filters," U. S. Department of Commerce, National Bureau of Standards, Circular C429 (1942).
4. Seibert, Charles A., "Atmospheric Gas Fading of Colored Acetate Rayon," Part II, The American Dyestuff Reporter, *31*, Number 25, 647-649 (1942).
5. Seibert, Charles A., Chairman, "Report of Committee on Atmospheric Fading of Dyed Cellulose Acetate Rayon" (1945).
6. "Yearbook of the American Association of Textile Chemists and Colorists," Howes Publishing Company, Inc., New York City, pages 272-275 (1945).

BOOK REVIEWS

Textile Microscopy in Germany

Textile Series Report No. 13. Office of Quartermaster General, Military Planning Division, Research and Development Branch. 146 pages. Price $5.50. Published by Textile Research Institute, Inc., 10 East 40th St., New York 16, N. Y. 1947.

This book is immediately characterized by several hundred excellent fiber micrographs, one series of which consists of electron micrographs. Practically every fiber of importance for textile purposes, both neutral and manufactured, is illustrated both longitudinally and in cross section.

In addition to the photomicrographs there is additional descriptive text. Part II for instance is an article by H. Reumuth of the Micro-Laboratory of the I.G. Farbenindustrie, an acknowledged authority, entitled "Application of Phase Microscopy to Textile Fibers"; Part III consists of a Bibliography of the Publications on Microscopy since 1938; Parts IV, V and VI consist of fiber atlases, with descriptive fiber properties; Part VII photo micrographs and analysis of fiber properties made by E. I. du Pont de Nemours & Co. at the request of the Quartermaster General and the Bureau of Standards. An appendix of 20 pages is devoted to electron fiber microscopy. In the text there is also a description of the microscopy laboratory of the I. G. Farbenindustrie at Hoechst written by Werner von Bergen.

In view of the importance of photomicrographic analysis in textile fiber research, it is believed that this book will be of great interest to the industry as a whole as well as to research organizations and consultants cooperating with the Quartermaster Corps.

Chemical Insect Attractants and Repellents

By Vincent G. Dethier, A.M., Ph. D., Professor of Zoology and Entomology at the Ohio State University. 239 pages. Price $5.00. Published by The Blakiston Co., Philadelphia.

The foreword written by Prof. Chas. T. Brues states that no complete and reliable account of the way in which various chemicals attract and repel insects has hitherto been available in a form which takes into account the fundamental basis of such behavior. Prof. Brues further states that the present volume by Prof. Dethier embodies such a treatment and is a noteworthy contribution.

The ravages of insects in agriculture, to say nothing of household losses through their destructive action, has always engaged the attention and ire of those directly affected, but only recently have anything but empirical, and trial and error methods been used in their extermination.

Only during the past several decades has there been any consistent movement to deal with the various problems of insect pests on the basis of sound scientific inquiry.

The rapid increase in our knowledge of insect physiology has gone hand in hand with the advance in general experimental physiology and has become part of the equipment with which entomologists have been able and willing to arm themselves in the war against noxious insects.

This volume presents a detailed study of the whole subject of insect attractants and repellents, both chemical and mechanical, and should prove of great value to all who are scientifically interested in methods of preventing the devastation of insect pests, a subject of such great interest to textile chemists.

The Chemical Composition of Foods

By R. A. McCance and E. M. Widdowson. Second Revised Edition. 156 pages. Price $3.75. Published by Chemical Publishing Co., Inc., Brooklyn, N. Y.

In the quantitative study of dietetics and nutrition it is essential to have a thorough knowledge of the chemical composition of foods.

This book supplies data in the form of tables, two sets of which are included; the first lists composition per 100 grams; the second tabulates composition per ounce.

The following constituents are listed: Water, sugar, starch, and dextrins; total nitrogen, protein, fat, available carbohydrates and calories; the elements—sodium, potassium, calcium, magnesium, iron, copper, phosphorus, sulfur and chlorine; and acid-base balance expressed in cubic centimeters of n/10 solution.

To those associated with food industries, dietitians, physicians, nurses, food and research chemists, this book should be of great value.

The recent war and its attendant nutritional problems created a demand for analytical data which made this new edition necessary.

The authors have made no change in the form of the main tables or text, but figures relating to a number of new food and raw materials have been added.

Over 541 varieties of food are analyzed. A number of recipes are included for prepared foods, for which the analyses are given.

Principles of Textile Converting

By Irving Teplitz. First edition. Copyright 1947. 192 pages. Illustrated. Textile Book Publishers, Inc. Price $4.00. U. S. and Canada. $5.00 in foreign countries.

The author is an experienced converter, now secretary of Richard Finishing Co. Inc., Jermy, Pa. He has presented in this volume the essential knowledge required for the converting of all types of fabric. Few, if any books, deal with this subject in such an inclusive manner. It covers the subject in a simple, non-technical and straight-forward style. It is not claimed to be a text book on dyeing and finishing but gives the fundamental facts about converting. It covers such subjects as the organization of the textile industry, vertical organization, fibers and yarns, construction of a fabric, types of fabric, converting procedure, converting problems, textile merchandising, future of real silk in America and the textile industry in the future. There is an appendix giving yarn tables and staple lengths of fibers, comparisons of different wools, fiber lengths and spinning systems, common cotton and rayon yarn sizes and prices, as well as twist contraction tables. An excellent index completes this small, handy manual which should be on every converter's desk. The book also is of interest to salesmen, printers, finishers, students, brokers and dyers of textile fabrics.

Practical Emulsions

Second Edition. Completely revised by H. Bennett, Technical Director, Glyco Products Co., Inc., and Editor-in-Chief of The Chemical Formulary. 568 pages. Price $8.50. Published by Chemical Publishing Co., Brooklyn, N. Y.

This book is divided into three sections. Part I deals with general information in regard to emulsions. It covers the technical consideration of such subjects as: Types of Emulsions, Emulsifying Agents, Foams and Frothing, Emulsion Stability, Dispersing and Wetting Agents. Part II consists of a symposium of fourteen papers on Emulsifying Agents and Emulsions in Industry by fourteen different authors, all authorities in their particular fields. Part III deals with specific emulsions for different industries as for example Textile, Leather, Paper, Water Proofing, Rubber, Medicinals, Lacquers, etc.

The subject of emulsions is of increasing importance in most every branch of industry, medical products, and foods, and this book gives an excellent overall consideration of the whole subject. More than 2,500 references are well distributed throughout the book.

Proceedings of the

American Association of Textile Chemists and Colorists

Copyright, 1948, American Association of Textile Chemists and Colorists

FEBRUARY 9, 1948

Membership Applications

ASSOCIATE

Henry R. Mayer—Salesman, Arnold, Hoffman & Co., Inc., Providence, R. I. Sponsor: I. W. Fallstrom.

William J. McLane—Salesman, Superior Color & Chemical Co., Paterson, N. J.

Joseph M. Perri—Chief Chemist, National Foam System, Inc., West Chester, Pennsylvania.

Dr. William E. Sohl—Assistant Director, Ceneral Research Laboratory, Minnesota Mining & Mfg. Co., St. Paul, Minn.

Max A. Seiler—Vice-President & Secretary, H. W. Baker Linen Co., of California, Inc., Los Angeles 14, Calif.

Monte L. Veze—Owner and Manager, Veze Fabrics, Hollywood, California.

STUDENT

Richard P. Barber—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Leonard C. Connors—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Stanley V. Dubiel—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Lynwood I. Gibson—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Edward L. Kelley—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Robert J. LeBrun—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Miriam Murphy—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Clyde Newland—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Vernon C. Thompson—Georgia School of Technology. Sponsor: C. A. Jones.

Doris M. McAllister—Philadelphia Textile Institute. Sponsor: P. Theel.

John C. Nelson—Philadelphia Textile Institute, Sponsor: P. Theel.

Arsene J. Berube—New Bedford Textile Institute. Sponsor: F. Tripp.

Julian A. Desjardins—New Bedford Textile Institute. Sponsor: F. Tripp.

Thomas J. Fay—New Bedford Textile Institute. Sponsor: F. Tripp.

Leroy V. Gordon—New Bedford Textile Institute. Sponsor: F. Tripp.

Samuel Helfand—New Bedford Textile Institute. Sponsor: F. Tripp.

Francis M. Hinds—New Bedford Textile Institute. Sponsor: F. Tripp.

Joseph C. Hutchinson—New Bedford Textile Institute. Sponsor: F. Tripp.

Robert F. Lehman—New Bedford Textile Institute. Sponsor: F. Tripp.

Christopher J. Limerick—New Bedford Textile Institute. Sponsor: F. Tripp.

John J. Murphy—New Bedford Textile Institute. Sponsor: F. Tripp.

Raymond A. Normandin—New Bedford Textile Institute. Sponsor: F. Tripp.

Charles Pappas—New Bedford Textile Institute. Sponsor: F. Tripp.

John Poulton, Jr.—New Bedford Textile Institute. Sponsor: F. Tripp.

William C. Privette—New Bedford Textile Institute. Sponsor: F. Tripp.

Lionel R. Rochefort—New Bedford Textile Institute. Sponsor: F. Tripp.

Walter G. Silva—New Bedford Textile Institute. Sponsor: F. Tripp.

Raymond K. Silveira—New Bedford Textile Institute. Sponsor: F. Tripp.

Joseph E. Viera—New Bedford Textile Institute. Sponsor: F. Tripp.

Edward B. Wood—New Bedford Textile Institute. Sponsor: F. Tripp.

Walter E. Bill—Lowell Textile Institute. Sponsor: E. E. Fickett.

Paul V. Boudreau—Lowell Textile Institute. Sponsor: E. E. Fickett.

Judith A. Brown—Lowell Textile Institute. Sponsor: E. E. Fickett.

Matthew N. Brunelle—Lowell Textile Institute. Sponsor: E. E. Fickett.

Leo S. Chang—Lowell Textile Institute. Sponsor: E. E. Fickett.

Pei C. Chao—Lowell Textile Institute. Sponsor: E. E. Fickett.

Milton Charatz—Lowell Textile Institute Sponsor: E. E. Fickett.

Edward Cherowbrier—Lowell Textile Institute. Sponsor: E. E. Fickett.

Therese R. Commerford—Lowell Textile Institute. Sponsor: E. E. Fickett.

Maurice Fishman—Lowell Textile Institute. Sponsor: E. E. Fickett.

Leo P. Gaidis—Lowell Textile Institute. Sponsor: E. E. Fickett.

Adelino P. Gouveia—Lowell Textile Institute. Sponsor: E. E. Fickett.

John L. Gregg—Lowell Textile Institute. Sponsor: E. E. Fickett.

Stanley J. Grochmal—Lowell Textile Institute. Sponsor: E. E. Fickett.

Philip A. Gruber—Lowell Textile Institute. Sponsor: E. E. Fickett.

Clifford A. Harvey—Lowell Textile Institute. Sponsor: E. E. Fickett.

Gabrielle M. Lemire—Lowell Textile Institute. Sponsor: E. E. Fickett.

Albert M. Levenson—Lowell Textile Institute. Sponsor: E. E. Fickett.

Dorothy A. McCarron—Lowell Textile Institute. Sponsor: E. E. Fickett.

James F. O'Donnell—Lowell Textile Institute. Sponsor: E. E. Fickett.

Herbert J. Smaha—Lowell Textile Institute. Sponsor: E. E. Fickett.

Richard I. Strobel—Lowell Textile Institute. Sponsor: E. E. Fickett.

Charles R. Trommer—Lowell Textile Institute. Sponsor: E. E. Fickett.

—♦ ♦—

Membership Applications

SENIOR

Morris Berger—Supt., Tekcraft Printing Co., New York, N. Y. Sponsors: N. W. Akst, E. A. Lutz.

Brooke, Henry C.—Chemist & Sales., Warwick Chem. Co. Div., Sun Chemical Corp., West Warwick, R. I. Sponsors: E. W. Brenner, H. F. Creegan.

Williams W. Williams—Sect. Leader, Azo & Misc. Dyes, Research Div., Central Research Lab., General Aniline & Film Corp., Sponsors: D. E. Marnon, F. Max.

JUNIOR

Milton L. Segal—Lab. Tech., Cantor Greenspan Co., Inc., New York, N. Y. Sponsors: M. Schuster, H. C. Borghetty.

ASSOCIATE

Charles J. Chainer—Textile Chemist, United Piece Dye Wks., Lodi, N. J. Sponsors: C. A. Heydon, R. J. De Witt.

Mitchel J. Lameire—Textile Chemist, United Piece Dye Works, Lodi, N. J. Sponsors: C. A. Heydon, R. J. De Witt.

STUDENT

Frederick R. Kern—Philadelphia Textile Institute. Sponsor: P. Theel.

APPLICATIONS FOR TRANSFER TO SENIOR MEMBERSHIP

Charles J. Haas, Walter H. Moon, Henry J. Rotters.

CORPORATE

Girdler Corporation.

Perkins Soap Company.

U. S. Process Corporation.

(Additional Applications on page P100)

Experimental Studies of Vat Dyeing*

O. W. CLARK

Manager, Textile Sales Service Laboratory
Dyes Technical Service Laboratory
Calco Chemical Division, American Cyanamid Company,
Bound Brook, New Jersey

Introduction

THIS paper describes briefly some experimental studies of Vat Dyeing which were engendered by recent trends in various fields of application.

In the cotton and rayon piece goods fields, there is tremendous interest in continuous vat dyeing methods which combine pigment padding and subsequent reduction at high temperatures.

In the wool industry, increasing attention is being devoted to the application of anthraquinone vat dyes to the wool fiber.

In the field of long chain warp dyeing of cotton yarn, the feasibility of applying vat dyes in a single continuous operation instead of in a tedious repetitive procedure is under study.

In the skein dyeing field, the cascade machine is replacing lower productive equipment which exerts a more detrimental effect on the physical qualities of the yarn.

Item one in the above list is given most emphasis in the following discussion and the other three items are discussed more briefly.

Selection of Dyes for Continuous Pigment Pad Dyeing Processes

The wide adoption of continuous dyeing methods for applying vat dyes at higher than normal temperature has initiated a demand for more data concerning the properties of vat dyes. The need for this data is especially evident when the dyeing system utilizes high temperature liquid reduction media in order rapidly to reduce and fix the dye which first has been applied to the material from a pigment dispersion. Certain of the problems which arise in a high temperature liquid reduction bath do not occur or are minimized when reduction and fixation of the dye occur solely in a steam atmosphere.

High temperature contributes two main advantages:

1. The rate of reduction is tremendously increased and modern finely dispersed vat dyes in pigment form reduced completely in a few seconds. Thus the advantages of pigment padding can be introduced into continuous dyeing systems by utilizing temperatures in the vicinity of 212° F. for brief periods of 10 to 60 seconds. Earlier attempts to develop continuous pigment pad methods operating at normal temperatures either did not secure the maximum fastness inherent in vat dyes or required cumbersome equipment including extremely large booster boxes.

2. The rate of diffusion of the leuco dye into the fiber is tremendously increased by high temperature. Excellent penetration and fixation result. Thus there is obtained the full fastness inherent in the vat dyes, although the duration of dyeing is only a few seconds.

Selection of Dyes

Three of the most important behavior factors to be considered in selecting dyes for high temperature application methods are:

I. Speed of Reduction.

II. Leuco Stability.

III. Affinity for the Fiber.

I. Speed of Reduction

If a vat dye does not completely reduce in the few seconds available; fixation, levelness, shade, and fastness may be below standard. If all the components in a compound shade do not behave similarly, shade variations may occur. Fortunately the majority of anthraquinone type vat dyes, when in the proper physical state, will reduce in 10 seconds or less at 212° F. in the presence of the high concentrations of caustic soda and sodium hydrosulfite, 2 oz.-6 oz. per gallon, which are commonly used in modern continuous processes.

The curves, Figures 1, 2 and 3, show typical reduction curves for vat dyes at normal and at high temperatures and the accelerating effect of high temperature is clearly evident.

II. Leuco Stability

Leuco stability is of most importance when reduction occurs in liquid media at high temperatures, especially if for the purpose of maintaining equilibrium between the dye on the fiber and the dye in the bath, appreciable amounts of dye exist in the leuco state in the liquid bath. Information about the leuco stability of vat dyes, especially at high temperatures, has not been part of the lore of the average vat dyer in the past and a brief discussion of leuco stability may therefore be of general interest, although all aspects may not apply directly to the selection of dyes for continuous pigment pad methods. A great many vat dyes are subject to one or more of the following undesirable reactions when the leuco compound is kept in an unfavorable environment for an excessive period of time.

1. Over Reduction

This occurs at excessive temperatures and/or at excessive Hydro concentrations. For example, the popular dichlorinated anthraquinone Vat Blue may be affected in the following manner.

(a) With mild overreduction the chlorine atoms are stripped off, giving a redder shade of poor chlorine fastness.

(b) As over-reduction proceeds a brown leuco is formed by the reduction of additional groups in the dye molecule and the dyed shade becomes dull and weak.

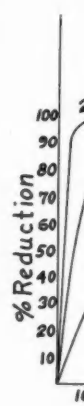
(c) Still further over-reduction introduces hydrogen atoms into the dye molecule with destruction of the affinity and shade of the dye.

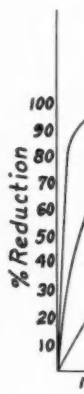
Of course in practice, each step shown above does not necessarily occur in the precise fashion, form, and extent described above, for the conditions of existing in a specific situation determine the exact behavior. The above exposition will suffice to emphasize the susceptibility of certain vat dyes to over-reduction.

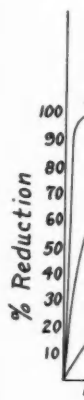
2. Hydrolysis

This occurs at excessive temperatures

* Presented at meeting, Southeastern Section, Atlanta, Georgia, December 7, 1946.







and/or at
The dyed
and deter
Vat Gold
R typify
dyed sha
change to
leuco und

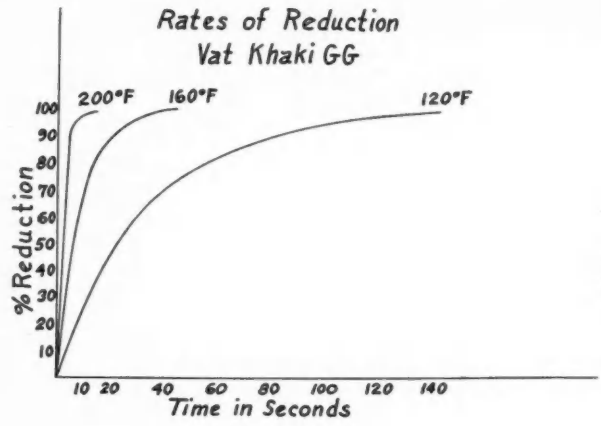


Figure 1.

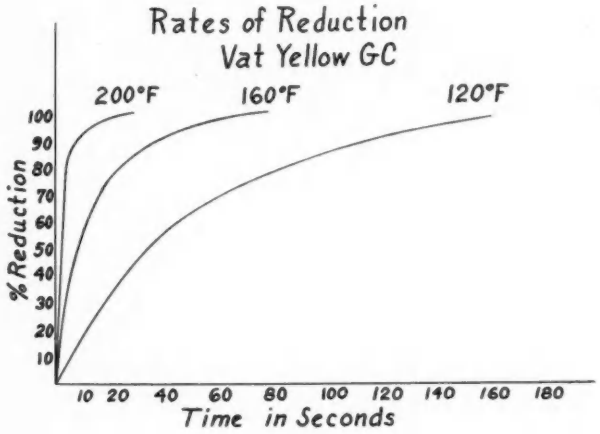


Figure 2.

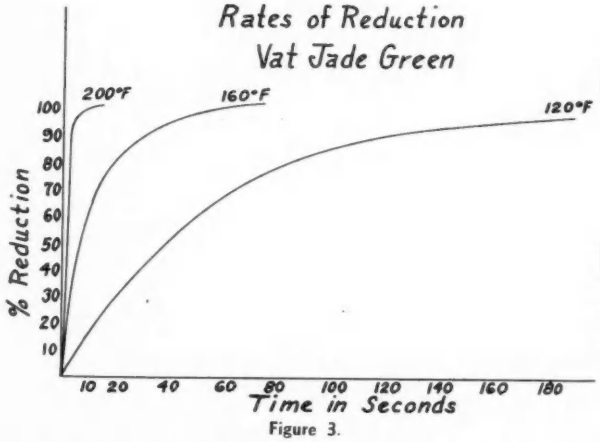


Figure 3.

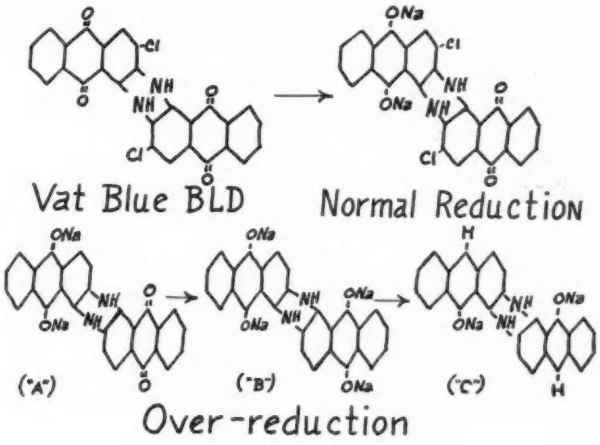


Figure 4.

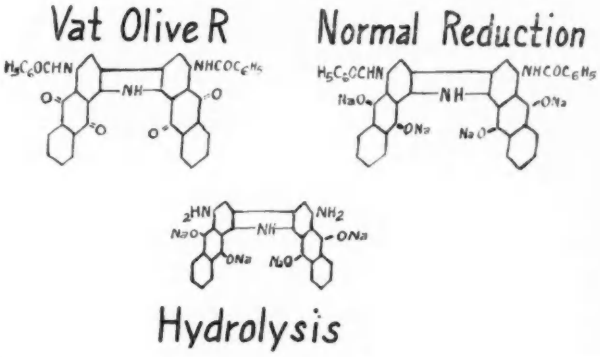


Figure 5.

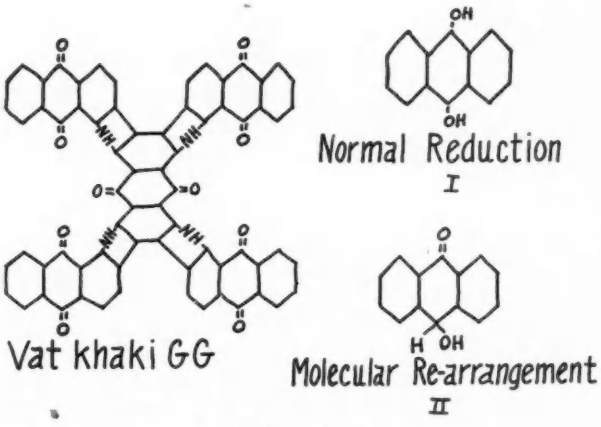


Figure 6.

and/or at excessive Caustic concentrations. The dyed shade exhibits a changed tone and deteriorated fastness. Vat Olive R, Vat Golden Orange 3G, and Vat Brown R typify dyes subject to this effect. The dyed shades of these particular dyes change to a much redder tone when the leuco undergoes hydrolysis.

3. Molecular Re-arrangement

This occurs at too low a pH due to an insufficient concentration of Caustic and results in a difficultly soluble compound with unsatisfactory dyeing properties. Vat Khaki GG is one of the vat dyes most readily subject to this effect.

Instead of reduction occurring in normal fashion, as in Figure 1, it proceeds as in Figure 2.

4. Sensitivity to Light

The leuco compounds of many vat dyes exhibit sensitivity to strong light and some to light of moderate intensity. A photo-

chemical change occurs. For example, Vat Orange 4R is changed to a much yellower shade wherever light impinges on a dyeing while it is in the leuco state.

5. Sensitivity to Hard Water

In the presence of hard water, many vat dyes form calcium or magnesium leuco compounds which either are insoluble or exhibit poor affinity for the fiber. Vat Blue BCS displays this characteristic to a marked degree.

6. Sensitivity to Dyeing Assistants

In the presence of dyeing assistants such as sodium lignin sulfonate, Peregal, etc., certain vat dyes display modified properties. Certain vat navy blues are sensitive to sodium lignin sulfonate and Blue BCS, Vat Jade Green and certain other dyes are sensitive to Peregal.

7. Crystallization

When the leuco concentration is too high, crystallization or precipitation may occur and re-solution may be difficult or impossible. Vat Red 2B (Rubine R), Vat Blue BCS, and Vat Orange 4R typify this effect.

Of these 7 reactions; over-reduction and hydrolysis are of greatest importance when selecting dyes suitable for continuous dyeing systems utilizing liquid reduction baths at high temperatures, where the dye which bleeds off of the cloth may exist in reduction for an excessive period of time. In those systems where reduction occurs solely in a steam atmosphere, the length of exposure of the leuco dye to high temperature is under strict control and undesirable reactions can be prevented or greatly subdued.

The colored plate shows the behavior of some of the important vat dyes when reduced at 140° F. and when reduced at 200° F.

Two ounces of double strength vat dye was reduced in one gallon of water containing two ounces of caustic soda and two ounces of sodium hydrosulfite per gallon. One series was reduced at 140° F. and one series at 200° F.

The original concentrations of caustic and hydro were maintained by additions when necessary during the two hour reduction period. At the end of ten minutes and at the end of two hours, spun viscose rayon cloth was padded through an aliquot of the reduced dye solution. The dyeings were rinsed, oxidized, and soaped by usual procedure.

These dyeings show what happens to the shade and strength of the vat dyes when treated in this manner. They show that certain dyes are very stable in the leuco state at high temperatures, others are fairly stable, and still others undergo considerable decomposition or are completely destroyed. It is advisable of course to use dyes with the best leuco stability, especially when using processes requiring high temperature liquid reduction media. However, in pigment pad processes where the padded cloth passes through high temperature liquid reduction media, only a portion of the dye is in the reduction bath and therefore the effect of high temperature on the shade and strength of the dyeing is less than shown in the color plate and it may be permissible to use other dyes than those with perfect leuco stability at high temperatures. It is obvious that such dyes as Blue BCS, Golden Orange 4R, and Olive R should be avoided when high temperature processes involve reduction in liquid caustic soda-sodium hydrosulfite media.

Since color plate printing does not exactly reproduce the original dyeings, some latitude should be exrcised in interpreting the plates. Several general observations are clear.

Dyes such as Orange G, Yellow GCD, Red BN, Violet BN, Jade Green, and Grey 2G show substantially similar shade and strength in all four dyeing of a set and may be rated as extemely stable at high temperature.

Dyes such as Yellow G, Violet 6RD, Dark Blue BO, Navy Blue, Brown R. Olive Green B, Brown BR, Grey RD, Grey BD, and Black BB show two different shades, one of which is the same for 10 minute or 2 hour reduction at 140° F. and the other being the same for 10 minute or 2 hour reduction at 200° F. These dyes can be used at a constant temperature, since the change which occurs in going from a low to a higher temperature seems to reach an end point from the practical viewpoint and does not rapidly continue to change.

Dye such as Orange 3G, Orange RRT, Orange 4R, Violet 2R, Blue BCS, Khaki 2G, and Olive R, change shade and strength to such an extent that their use is inadvisable in high temperature liquid reduction media using caustic soda and sodium hydrosulfite.

III. Exhaust Behavior

The exhaust behavior of Vat Dyes should be carefully considered when selecting dyes for dyeing systems employing high temperature liquid reduction media. It is of much less concern when using continuous systems where reduction occurs solely in a steam atmosphere and the fiber to bath ratio is 1:1 or less. However, even in the latter system trouble may occur if a vat dye with affinity at temperatures below 100° F. is used, for then dyeing may occur in the chemical padder and the maintenance of equilibrium will be difficult. Vat Blue 2BD, for example, will dye rapidly at 90° F.

The exhaust behavior of vat dyes is affected by the concentration of dye, the kind of fiber, the ratio of fiber to dyebath, the concentration of electrolytes in the bath, and the presence of dyeing assistants. Dye components for compound shades should exhibit similar exhaust behavior, especially when high temperature liquid reduction media are used. As a class, vat dyes exhaust with extreme rapidity, but relative to each other may be designated as very fast, fast, medium, and slow. Large concentrations of Salt are often maintained in high temperature liquir reduction baths in order to decrease the amount of dye which is retained in the bath. Besides producing the quickest possible speed of exhaust, Salt accelerates the rate of diffusion of the leuco dye into the fiber.

The quantity of dye which bleeds off of the pigment padded cloth into a high temperature liquid reduction bath, and therefore the effect of exhaust behavior upon the control of shade can be considerably decreased by drying the cloth as it leaves the pigment padder. This step is necessary except when dyeing very light shades.

The following table (Table I) shows the speed of exhaust of vat dyes which, relative to each other; are classed as very fast, fast, medium, slow. These exhaust tests were made at 200° F. using: A, no salt; B, 8 oz. Salt per gallon; C, 16 oz. Salt per gallon. Figure 7 shows typical dyes for each exhaust rate class.

Similar dyed skeins were shown for the full line of vat dyes during the lecture.

The Application of Vat Dyes to Wool

The use of anthraquinone vat dyes on wool is of interest for dyeing pastel shades, especially those of good brilliancy which must withstand prolonged light exposure. These vat dyes are also of interest for producing medium and full shades with extremely high fastness to wet treatments, although high cost prevents wide use for this purpose at present. Vat dyes are readily applied to stock, slubbing, tops, and yarn; but a practical commercial method for dyeing a range of shades on cloth is yet to be developed. Wool stock, wool slubbing, and wool tops which have been vat dyed in commercial batches pass through the subsequent manufacturing operations with at least as great, and usually with greater facility than material dyed with the usual types of wool dyes. At least 4 methods for applying vat dyes to wool are in existence; the ammonia

e 2BD, for
0° F.
at dyes is
f dye, the
o dyebath,
tes in the
eing assis-
compound
r exhaust
tempera-
e used. As
extreme
er may be
dium, and
Salt are
mperature
o decrease
etained in
e quickest
ccelerates
o dye into

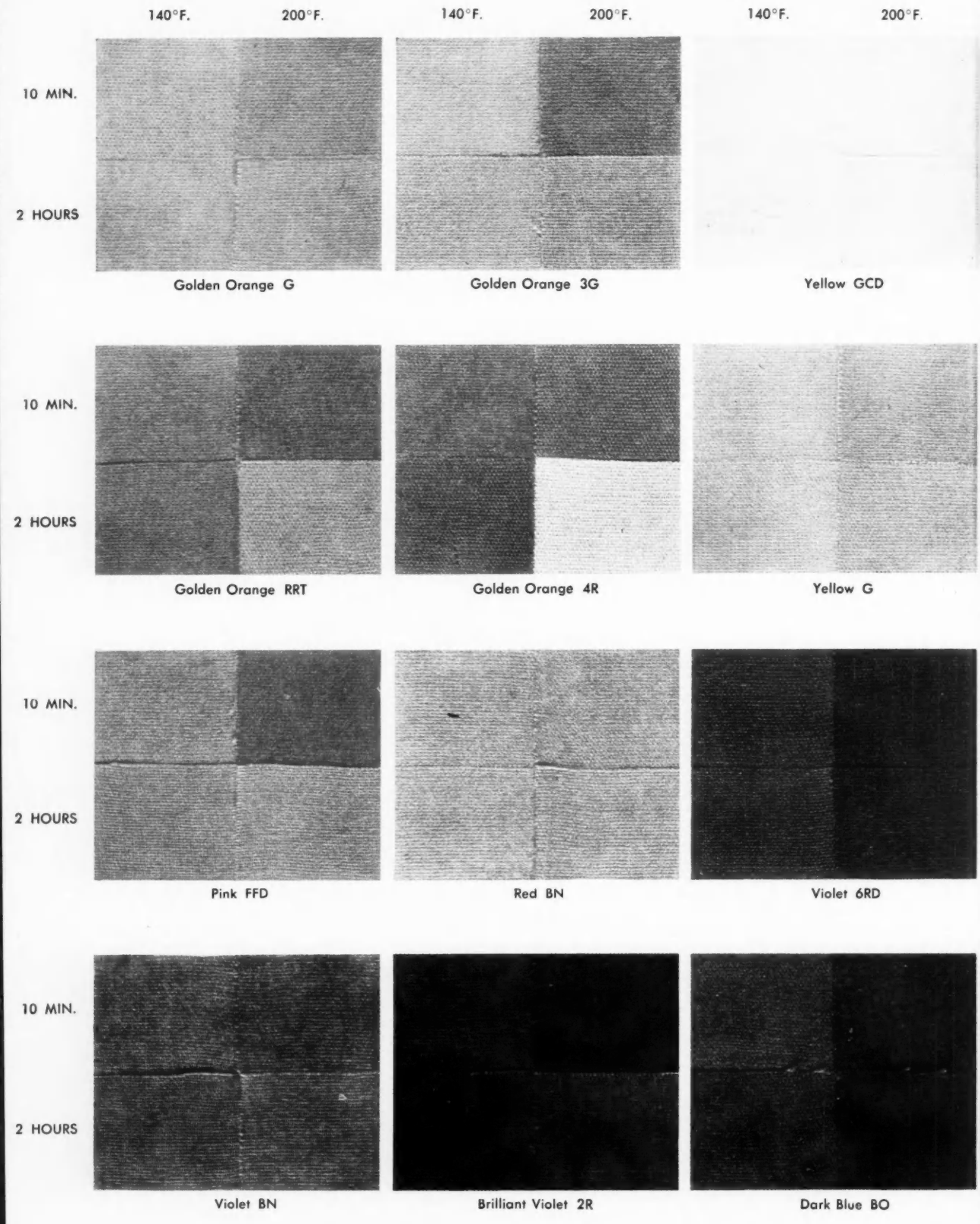
bleeds off
to a high
oath, and
behavior
be con-
the cloth
This step
very light

shows the
hich, rel-
l as very
e exhaust
g: A, no
C, 16 oz.
s typical
.
own for
ring the

Dyes to

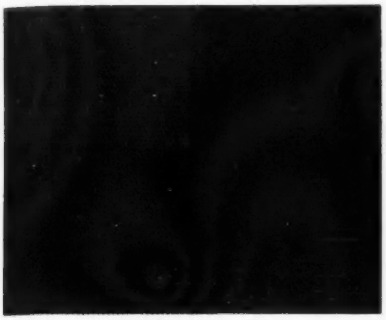
dyes on
el shades,
cy which
exposure.
erest for
des with
eatments,
e use for
dyes are
ng, tops,
mmercial
hades on
ol stock,
ich have
ches pass
ring op-
l usually
ial dyed
dyes. At
vat dyes
mmonia

y 9, 1948

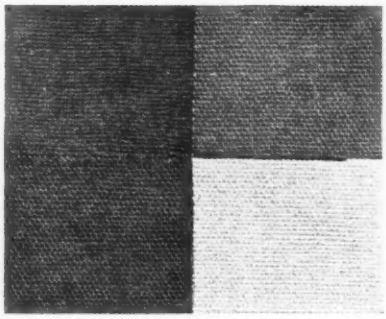


Leuco Stability of Vat Dyes — Dyeing Tests Made in Application Laboratories

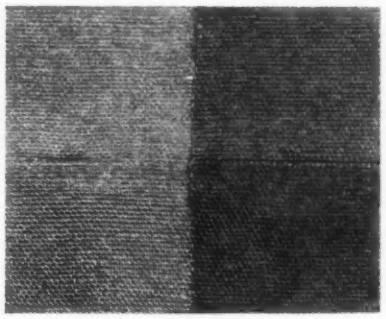
140°F. 200°F. 140°F. 200°F. 140°F. 200°F.



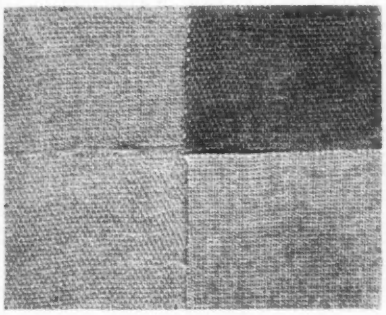
Navy Blue



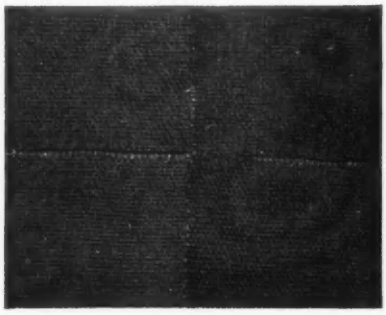
Blue BCS



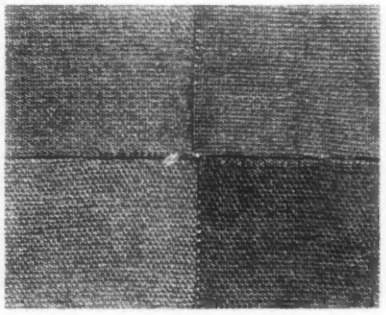
Brown R



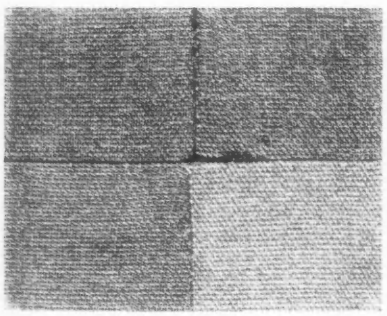
Olive Green B



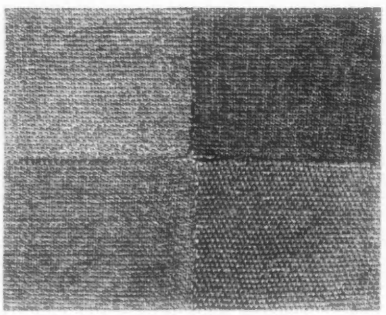
Jade Green



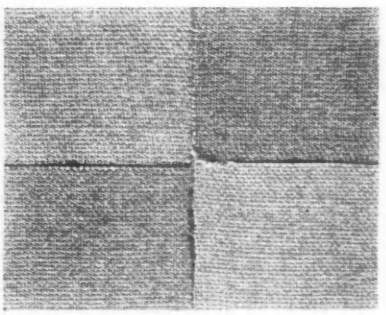
Brown BR



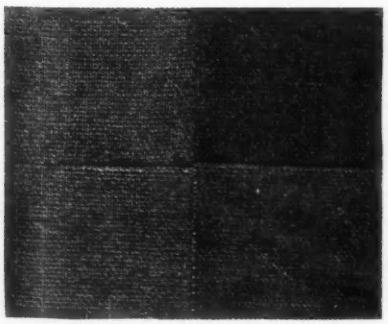
Khaki 2G



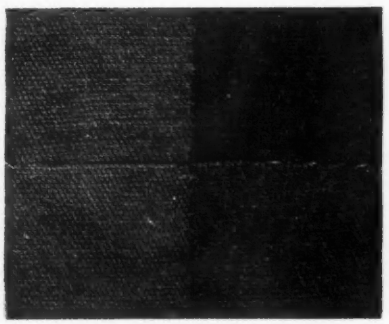
Grey 2G



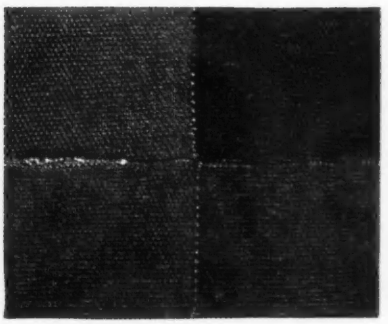
Olive R



Grey RD



Grey BD



Black BB

Calco Chemical Division, American Cyanamid Company, Bound Brook, N. J

Black
Grey B
Grey R
Grey 2
Blue 2
Blue R
Blue G
Blue B
Blue R
Blue 3
Na.y
Dark
Violet
B. Vio
Violet
Pink F
Red B
Jade G
Olive
Khaki
Brown
Brown
Copper
Olive
Fl. Or
G. Ora
G. Ora
Yellow
Yellow

method,
the vat-a
sodium l
The an
ence for
for most
though t
cause of
indigoid
colors w
and the
be exerci
dyehouse

TABLE I

Exhaust Behavior at 200° F.

	EXHAUST SPEED			RELATIVE STRENGTHS OF FIRST EXHAUST SKEIN		
	No Salt	*8 oz. Salt/gal.*	*16 oz. Salt/gal.*	*No Salt*	*8 oz. Salt/gal.*	*16 oz. Salt/Gal.*
Black BB	Very fast	Very fast	Very fast	100	100	100
Grey BD	Fast	Fast	Fast	100	100	100
Grey RD	Medium	Fast	Very fast	100	110	120
Grey 2G	Fast	Very fast	Very fast	100	125	150
Blue 2BD	Fast	Very fast	Very fast	100	100	100
Blue R	Fast	Very fast	Very fast	100	150	175
Blue GCD	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
Blue BLD	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
Blue RS	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
Blue 3G	Fast	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
Navy Blue	Fast	Very fast	Very fast	100	110	120
Dark Blue BO	Fast	Very fast	Very fast	100	100	100
Violet BNx	Very fast	Very fast	Very fast	100	100	10 (ppt.)
B. Violet 2R	Fast	Fast	Fast	100	110 Bronzy	110 Bronzy
Violet 6RD	Madium	Madium	Medium	100	125	125
Pink FFD	Medium	Medium	Fast	100	125	150
Red BN	Medium	Fast	Very fast	100	150	200
Jade Green N	Fast	Very fast	Very fast	100	100	100
Olive Green BN	Very fast	Very fast	Very fast	100	125	150
Khaki G	Medium	Medium	Medium	100	110	110
Brown BR	Slow	Medium	Medium	100	160	150
Brown R	Slow	Medium	Medium	100	150	175
Copper Brown	Slow	Medium	Medium	100	150	150
Olive R	Slow	Medium	Medium	100	150	200
Fl. Orange 2R	Fast	Fast	Very fast	100	100	100
G. Orange RRTD	Fast	Fast	Very fast	100	100	100
G. Orange GD	Fast	Very fast	Very fast	100	110	120
Yellow G	Fast	Very fast	Very fast	100	110	120
Yellow GCD	Medium	Fast	Very fast	100	100	100

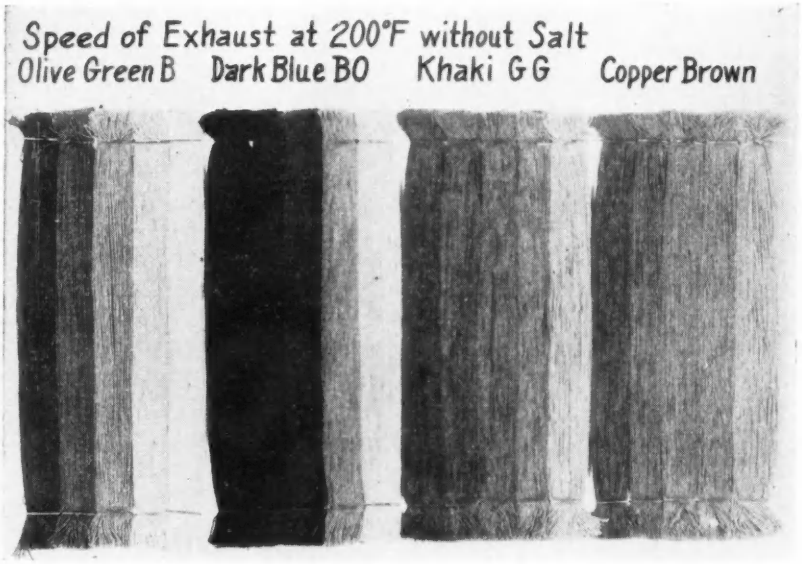


Figure 7.

method, the trisodium phosphate method, the vat-acid method, and the caustic soda-sodium lignin sulfonate method.

The ammonia method has been in existence for many years but it is not suitable for most anthraquinone type dyes, although these are the desirable types because of excellent fastness properties. The indigoid types dye well but the range of colors with adequate fastness is limited and the precise pH control which must be exercised is not adapted to American dyehouses and labor.

The vat-acid method is complicated and in our experience does not give any better results, and in many cases not as good results, as simpler methods.

The trisodium phosphate works well with the limited number of vat dyes which are suitable and the procedure is simple.

The caustic soda-sodium lignin sulfonate method is simple and is generally the most useful procedure. When correctly executed, the wool retains a soft lofty hand and the strength is not unduly impaired and usually is better than when fast wool dyes are used. It is not always clearly recognized that when wool is dyed with the faster types of regular wool dyes, its strength may be decreased 25% or more and considerable harshening of the fiber may occur.

Typical commercial procedure for vat shades on wool slubbing, tops, and stock, applied by the caustic-sodium lignin sulfonate method, follow. Samples of the dyed material were displayed.

Typical Procedures for Vat Dyeing Wool in the Form of Slubbing, Tops or Stock, and Yarn

Sky Blue

Calcosol Blue 3G Paste	1.07%	
Calcosol Jade Green Supra Double Paste	0.20%	
Sodium Lignin Sulfonate	¼ oz.	per gallon
Caustic Soda	¼ oz.	per gallon
Sodium Hydrosulfite	1/3 oz.	per gallon
Common Salt	4 oz.	per gallon

Fill machine with cold water and add neutral solution of sodium lignin sulfonate. Add caustic soda. Add hydro just before adding dye.

Meanwhile the dye is reduced at 140° F. with 4 oz. of caustic and hydro per gallon.

Add the reduced dye to the cold bath and circulate 5 minutes cold. Circulate 15 minutes, raising temperature to 120° F. After circulating 10 minutes at 120° F., add the salt in two portions 10 minutes apart. Circulate 10 minutes more.

Drain and rinse cold.

Add 2% of 56% acetic acid and 1% of 100 volume hydrogen peroxide and run 5 minutes cold. Circulate 20 minutes, raising temperature to 140° F.

Drain and rinse.

Aftertreat 20 minutes at 180° F. with

synthetic detergent and rinse well 180° F.

Taupe

Calcosol Brown BR Paste.	2.00%
Calcosol Grey 2G Double Paste	0.34%
Sodium Lignin Sulfonate..	¼ oz.
Caustic Soda	1/3 oz.
Sodium Hydrosulfite	⅜ oz.
Common Salt	4 oz.

(per gallon)

Fill machine with cold water. Add neutral solution of sodium lignin sulfonate. Add caustic. Add hydro just before adding dye.

Meanwhile the dye is reduced at 140° F. with 4 oz. caustic and hydro per gallon. Add the reduced dye and circulate 15 minutes, raising temperature to 120° F. Add the salt in two portions 10 minutes apart and circulate 10 minutes more. Complete the dyeing process as outlined for Sky Blue.

Worsted warn dyed in package form was on display and the procedures used were as follows:

Grey

Formula—Pigment Method with Caustic Soda and Sodium Lignin Sulfonate

Calcosol Grey 2 G Double Paste	4%
Calcosol Copper Brown Paste	1%
Sodium Lignin Sulfonate..	¼ oz.
Caustic Soda	¼ oz.
Sodium Hydrosulfite	⅜ oz.
Common Salt	4 oz.

(per gallon)

The wool yarn was wet out at 140° F.

Decceresol OT-25%	⅛ oz.
Trisodium Phosphate	⅛ oz.

(per gallon)

The bath was drained, the wool yarn rinsed at 140° F., and the machine refilled at 140° F.

The yarn was pigmented for 20 minutes at 140° F. with the dispersed dye and the sodium lignin sulfonate.

The caustic was added and then the hydro was added and dyeing carried out for 20 minutes at 140° F. The salt was added in 3 portions, 5 minutes apart, and the dyebath was circulated for 5 minutes longer.

The dyeing was rinsed well with cold water.

The dyeing was oxidized with 1 oz. of 56% acetic acid and ¼ oz. of 100 volume hydrogen peroxide per gallon, starting cold and heating to 140° F.

After rinsing the dyeing was aftertreated 20 minutes at 180° F. with ¼ oz. of synthetic detergent per gallon.

Violet

Formula—Reduced Method with Trisodium Phosphate and Sodium Lignin Sulfonate

Calcoloid Violet 6RD Double Powder 2%. (This dye shows excellent fastness to light on wool).

Sodium Lignin Sulfonate....	¼ oz.
Trisodium Phosphate	1 oz.
Sodium Hydrosulfite	⅜ oz.
Common Salt	4 oz.

(per gallon)

The wool yarn was wet out as for the grey shade.

The dyebath was prepared with:

Trisodium Phosphate	¾ oz.
Sodium Lignin Sulfonate....	¼ oz.
Sodium Hydrosulfite	1/3 oz.

(per gallon)

The dye was reduced in ⅛ the dyebath volume at 160° F., using the rest of the trisodium phosphate and sodium hydrosulfite.

One-half of the reduced dye was added on the outside-in cycle and one-half on the inside-out cycle and the dyebath circulated for 20 minutes at 120° F. The salt was added in 3 portions, 5 minutes apart, and the dyebath circulated 5 minutes longer.

The dyeing operation was completed as for the grey shade.

Green

Formula—Pigment Method with Caustic Soda and Sodium Lignin Sulfonate

Calcosol Jade Green Supra Double Paste	2%
Calcoloid Yellow GCD Double Powder	2%

Same procedure as for Grey shade.

Long Chain Warp Dyeing

Long chain warp dyeing has been in operation for a great many years, utilizing rather crude equipment of ancient vintage, devoid of automatic control devices and with squeeze rolls of doubtful efficiency. Such equipment produces dyeings with poor fastness to washing and crocking and, except for indigo ranges, has low productive capacity.

A typical procedure for a light vat shade requires 8 ends and about 24 hours to process a 7,000 yard warp and most machines handle 4 to 6—7,000 yard warps at a time.

End 1. Wet out yarn through a boiling soda ash bath.

End 2. Add 1/6 of dye to starting bath and feed on 2/6 of dye during the end.

End 3. Add 1/6 of dye to bath and feed on 2/6 of dye during the end.

End 4 and 5. Run yarn through the dyebath to exhaust dye and level out shade.

End 6. Run yarn through a rinsing bath.

End 7. Run yarn through a boiling soap bath.

End 8. Rinse yarn.

With the advent of new and well designed machinery, with the discovery of efficient wetting agents, and with the acquisition of extensive fundamental data on the behavior of vat dyes, it has become possible to devise continuous processes for applying vat dyes to unscoured cotton warps and to secure greatly improved fastness.

Figure 8 shows the essential requirements for the dyeing steps only, for one type of continuous warp range using the "reduced" method.

The basic procedure in setting up a formula and running a dyeing is as follows:

1. A one liter dyebath is made up and a 10 gram skein is dyed for the same length of time that the warp will be immersed in the dyebath on the range. When the correct concentration of dye to produce the desired shade has been determined, the amounts are expressed in ounces per gallon and they represent the starting bath formula for the range dyebath.

2. The standard shade is also matched by dyeing a 10 gram skein in 1:10 ratio, exhausting the bath as completely as possible. From this dyeing is calculated the pounds of dye which must be fed per 100 lbs. of yarn.

Typical Procedure

24-7,000 yard warps. Weight = 10,000 lbs.

Pick-up from dyebath = 50% = 5,000 lbs. = 600 gallons of liquor.

Dyebath volume = 1,000 gallons.

Speed = 40 yards per minute. Immer-

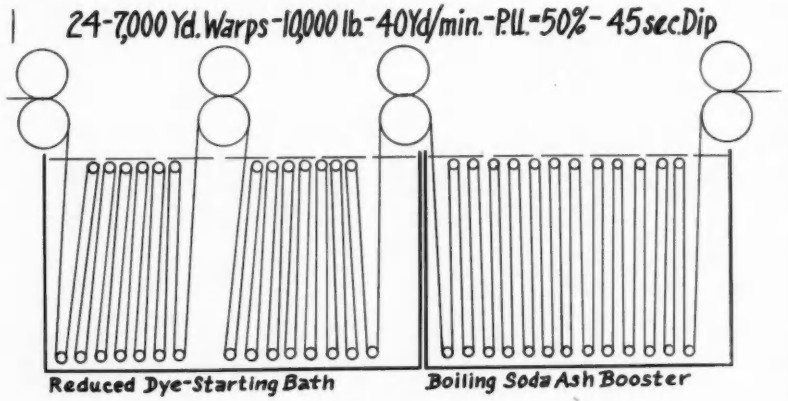


Figure 8.

sion time = 45 seconds.

At a pick-up of 50%, 24-7,000 yard warps require a feed of 600 gallons in 175 minutes or 3.45 gallons per minute.

	Starting Bath	Feed	Feed
Calcoloid Blue BLD Double Paste	125 lbs.	300 lbs.	
Calcosol Navy Blue Paste	22 lbs.	135 lbs.	
Calcoloid Grey BD Paste	18 lbs.	140 lbs.	
Caustic Potash	135 lbs.	30 lbs.	
Hydro	95 lbs		22 lbs.
Deceresol OS (66% Paste)	25 lbs.	15 lbs.	
Temperature = 140° F.	1000 gal.	600 gal.	

The dye is fed in pigment form because the minimum concentration, limited by the liquid pick-up, is approximately 12 oz. per gallon, which is well beyond the leuco solubility of the dyes. The hydro is fed in automatically in powder form at the rate of 2 oz. per minute. The caustic and hydro feed will of course vary with the conditions existing in a specific plant and must be established by titration.

The soda ash booster contains:

Soda Ash	200 lbs.
Salt	300 lbs.
Caustic Soda	10 lbs.
Sodium Hydrosulfite	40 lbs.

600 gallons at 212° F.

The soda ash booster is followed by rinsing, oxidation, soaping, and drying equipment in range.

A still more satisfactory method of long chain warp dyeing is a pigment pad method involving rather expensive and specialized machinery. Penetration, levelness and fastness produced by this method is superior to that produced by reduced dyeing methods.

Skein Dyeing on Cascade Machine

The cascade type of skein dyeing machine turns out vat dyeing in an extraordinarily short time and preserves the original physical condition of the yarn very well. The actual dyeing period itself is usually about 6 minutes and the majority of shades exhaust satisfactorily and dye levelly in this period. Very full shades such as black and navy may require a dyeing period of 12 to 18 minutes. When difficulty in levelling is encountered, varying the method of application will correct the trouble.

Dyeings were on display showing how variations in dyeing procedure affected the levelness of a 3% green shade and a ¾% blue shade on mercerized thread yarn. The procedures used were:

Green 160-8 oz. Skeins = 80 lbs. on 10 Arms. 150 gallons.

	I Dry Yarn	II Wet Out Yarn	III Dry Yarn
Calcosol Green BN Double Paste	2 lb.	2 lb.	2 lb.
Calcoloid Yellow GCD Double Paste	⅜ oz.	⅜ oz.	⅜ oz.
Caustic	9½ lb.	9½ lb.	9½ lb.
Hydro	9½ lb.	9½ lb.	9½ lb.
Soap Flakes	3 lb.	.....	3 lb.
Deceresol OT-25%	.....	2 lb.	.....
Reduced	180°F.-2 min.	140°F.-10 min.	200°F.-2 min.
Dyed	180°F.-6 min. 120°F.-10 min.	80°F.- 6 min.	200°F.-7 min.

Procedure III gave the most level dyeing.

Blue 160-8 oz. Skeins = 80 lbs. on 10 Arms. 150 gallons.

	I Dry Yarn	II Dry Yarn	III Dry Yarn
Calcoloid Blue BLD Double Paste	6 oz.	6 oz.	6 oz.
Calcosol Jade Green Supra Double Paste	4 oz.	4 oz.	4 oz.
Caustic	9½ lb.	9½ lb.	9½ lb.
Hydro	9½ lb.	9½ lb.	9½ lb.
Peregal OK	.....	1½ lb.	1½ lb.
Reduced	140°F.-5 min.	240°F.-5 min.	140°F.-5 min.
Dyed	240°F.-5 min.	140°F.-6 min.	½ dye 4 min.) 140°F. ½ dye 8 min.)

Procedure III gave the most level dyeing.

Research Activities

FORMATION of a new research subcommittee to study small color differences in textiles was announced at a recent meeting of the Research Committee. Daniel P. Knowland of Geigy Co., Inc., is chairman of the new Committee on Small Color Differences. Dr. Harold Stiegler, Director of Research, reported that two projects which have been extremely active are now nearly completed—these are a project for the Quartermaster Corps. on Army fabrics and one on the water repellency of textiles. Progress was reported on the development of improved methods for testing the fastness of colored textiles to washing and perspiration.

February 28th Meeting, Mid-West Section

THE February meeting of the Mid-West Section will be held at the Bismarck Hotel on Saturday, the twenty-eighth.

The afternoon session, starting promptly at 2:30 P.M., will be highlighted by a colored sound movie entitled: "Metachrome Dyeing with Metomega Chrome Colors". This film, prepared under the technical direction of the Sandoz Chemical Works, Inc., will illustrate actual mill operations of interest to all.

Following the movie, there will be an opportunity for general discussion.

Dinner will be served promptly at 7:00 P.M.

The speaker of the evening will be Leonard Shapiro, Research Director of the Alrose Chemical Company. His subject is "Wool Shrinkage Control". Mr. Shapiro received his degree of Master of Science from the Mass. Inst. of Technology, and was formerly research director for Interlaken Mills and for the Warwick Chemical Company. Mr. Shapiro is well qualified to give a most interesting talk on this very timely subject.

Hotel reservations should be made as early as possible direct to the Bismarck Hotel.

Western New England Section

ORGANIZATION of a Western New England Section was authorized at a recent meeting of the Council.

CALENDAR

PHILADELPHIA SECTION
Meetings: February 27, April 9, May 14 (Kugler's, Philadelphia); Outing: June 11 (Atlantic City Country Club, Northfield, N. J.)

NEW YORK SECTION
Meeting: March 12 (Hotel New Yorker, N. Y.); May 7 (Swiss Chalet, Rochelle Park, N. J.); Outing: June 18 (North Jersey Country Club).

PIEDMONT SECTION
Meetings: Apr. 3 (Robt. S. Lee Hotel, Winston-Sales. N. C.); June 18 (Ocean Forest Hotel, Myrtle Beach, S. C.).

NORTHERN NEW ENGLAND SECTION
Meetings: March 19 (Boston); April 16 (Lowell Textile Institute); May 21, June 11 (Outing); September 24 (Andover Country Club); November 19.

MID-WEST SECTION
Meeting: February 28 (Bismarck Hotel, Chicago).

SUB-COMMITTEES
Meeting: April 1.

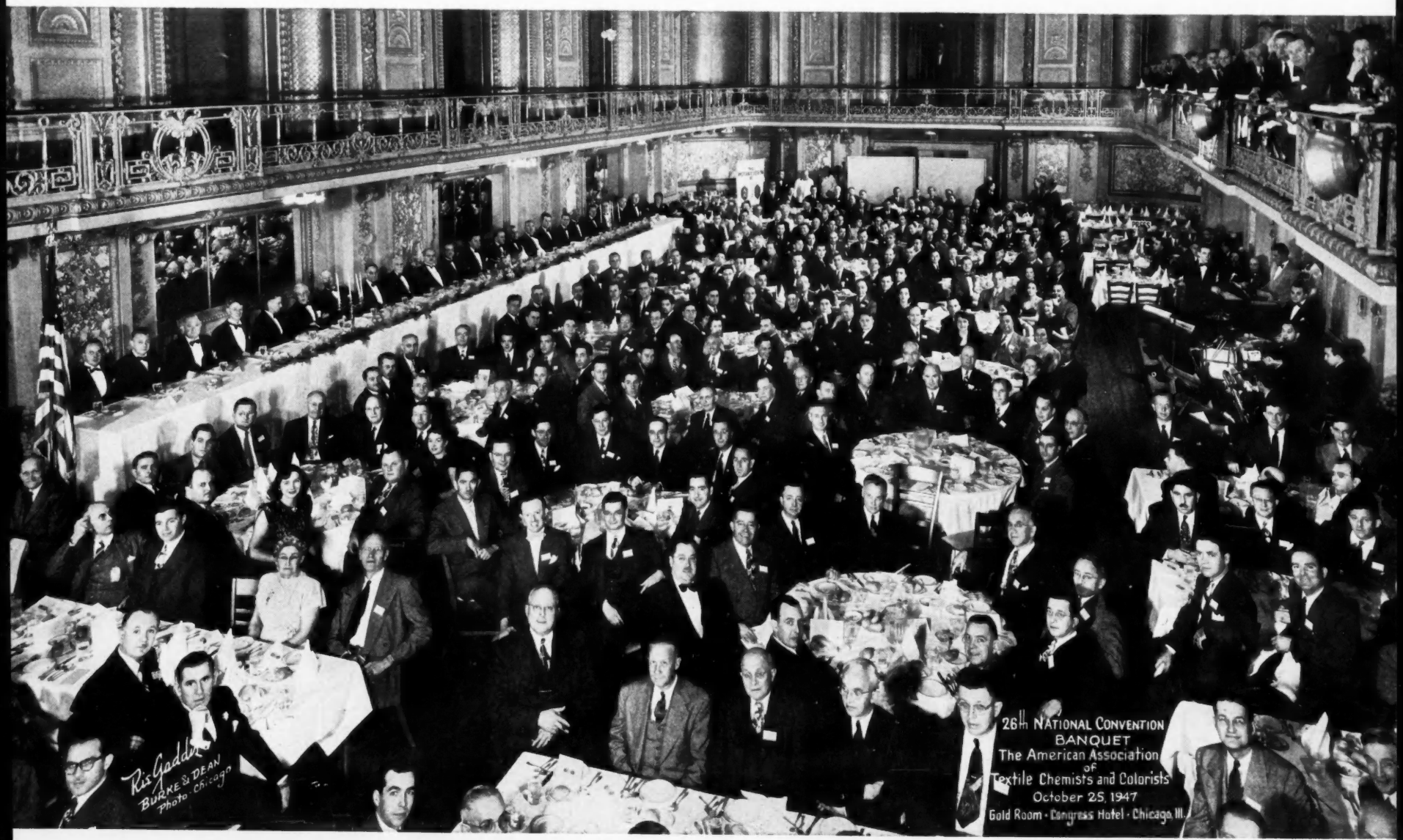
COUNCIL
Meeting: April 2.

RESEARCH COMMITTEE
Meeting: April 2.

MANY
piece
they come
intermedia
stage of r
emulsified
animal or
weaving
of manufa
Emulsified
ing into w
Certain ty
may be s
considerab
scouring
cated that
organic de
removal
other tha
proper me
This inves
to determi
removal o
rics and w
of "Nacco
The rem
oils from
sented a s
fabric con
the prelim
ditional in
ing proced
also be ob

(1) Woo
3.94% mi
(2) Woo
4.49% lar
These fa

* Presente
Meeting, R
tional Conve
† Tradema
ent Office by
The statem
"Nacconol"
opinion, base
tions, and ar



AMONG THOSE PRESENT AT THE ANNUAL BANQUET, CHICAGO NATIONAL CONVENTION, OCTOBER 25, 1947.

Non-Cellulosic Fibers Group Meeting—

Wool Piece Goods Scouring with a Synthetic Organic Detergent*

O. M. MORGAN

New Products Division
National Aniline Division, Allied Chemical & Dye Corporation

Abstract

Emulsified mineral oil lubricants are coming into wider use by the textile industry. Certain types of emulsified mineral oils may be scoured out of the fabrics with considerable ease while others present real scouring problems. Tests conducted in laboratory scouring equipment as well as in dolly washers and continuous scouring machines have indicated that "Nacconol" NR, a synthetic organic detergent, is a very efficient scouring agent for the removal of emulsified mineral oil lubricants from wool piece goods. This synthetic detergent may be used by itself to remove the mineral oil compositions or may be built with suitable salts such as sodium chloride or sodium bicarbonate. Best scouring results are obtained under neutral or slightly alkaline conditions. High alkalinity should be avoided. The type of salt used as a builder for this synthetic detergent has an important bearing on the scouring efficiency.

MANY types of woolen or worsted piece goods are scoured directly as they come from the loom without any intermediate fulling operations. At this stage of manufacture the fabrics contain emulsified mineral oils, mineral oil or animal or vegetable oils as spinning and weaving lubricants. During later stages of manufacture these oils must be removed. Emulsified mineral oil lubricants are coming into wider use by the textile industry. Certain types of emulsified mineral oils may be scoured out of the fabrics with considerable ease while others present real scouring problems. Experience has indicated that "Nacconol" NR†, a synthetic organic detergent, is very effective for the removal of mineral oils from surfaces other than textiles provided that the proper methods of application are used. This investigation was planned primarily to determine optimum conditions for the removal of mineral oil from woolen fabrics and was confined to the performance of "Nacconol" NR.

The removal of animal and vegetable oils from woolen fabrics has never presented a serious problem, but a woolen fabric containing lard oil was included in the preliminary investigation so that additional information on the proper scouring procedure for this type of oil might also be obtained.

Fabrics Tested

(1) Wool blanket material containing 3.94% mineral oil.

(2) Wool blanket material containing 4.49% lard oil.

These fabrics were obtained from production lots in a woolen mill and were cut into swatches 3" x 16" for experimental purposes. Soxhlet extractions of those swatches with ether indicated that the oil content from swatch to swatch was of a very uniform nature.

Experimental Procedure

The mechanical washing arrangement was quite simple. The goods were immersed in the scouring solution at the desired temperature and agitated gently by hand for 30 seconds. The fabric was then passed between the rolls of an ordinary household wringer, the wringer liquor being returned to the scouring solution. The fabric sample was then returned to the scouring solution and treated in a similar fashion for several consecutive immersions and squeeze roll operations. This type of scouring procedure corresponds generally to that obtained in the new squeeze roll washing machine now being developed by the Detergency Committee of the AATCC. It also corresponds to the type of washing action obtained in a textile mill.

Rinsing was conducted in two consecutive portions of distilled water at 120° F, each rinse being followed by passage of the fabric through the squeeze rolls.

After scouring the fabrics were dried for 3 hours in a forced draft oven at 180° F, following which they were subjected to Soxhlet extraction with ether to determine the residual grease content.

In the present investigation the concentration of synthetic detergent was purposely held at a low level, 0.1-0.2%, in order that the effect of other added scouring agents might be noticed more rapidly without processing large quantities of fabric. It might be noted at this point that the concentration of this synthetic detergent used in normal practice in either dolly washers or continuous scouring machines is of the order of 0.40-1.0% based on the weight of the liquor and depending on the oil content of the fabrics prior to scouring.

Preliminary Scouring Tests

To determine the scouring efficiency of the laboratory scouring arrangement samples of wool fabrics containing mineral oil or lard oil were subjected to 5, 10 or 15 immersions in the detergent solution and passages through the squeeze rolls, respectively. These data are presented in Table I. Since a fabric containing something less than 1% of oil is usually acceptable for future processing, it is ob-

* Presented at Non-Cellulosic Fibers Group Meeting, Robert C. Anderson, Presiding, National Convention, Chicago, October 24, 1947.

† Trademark "Nacconol" registered U. S. Patent Office by Allied Chemical & Dye Corporation. The statements made herein with respect to "Nacconol" NR are expressions of the author's opinion, based upon careful tests and investigations, and are not warranties.

TABLE I

Wool Piece Goods Scouring—(1) Mineral Oil (2) Lard Oil
Determination of the Amount of Scouring Needed

Procedure:—
Volume of Scouring Solution—1500 cc
Size of Fabric Sample —3" x 16"
Scouring Temperature —130°F (54°C)
Scouring Procedure —Stir fabric in solution by hand for 30 sec. Pass through wringer. Repeat to total of 5, 10 or 15 passes. Rinse—2 passes—120°F—Distilled Water.

Expt. No.	Composition of Scouring Solution	Residual Oil Content (%) after:— 5 immersions	10	15
A. Mineral Oil Fabric				
1	0.2% Synthetic Detergent	1.46	0.67	0.50
2	0.2% Synthetic Detergent + 0.3% Soda Ash	2.28	2.17	1.97
B. Lard Oil Fabric				
1	0.2% Synthetic Detergent	0.78	0.85	0.44
2	0.2% Synthetic Detergent + 0.3% Soda Ash	0.25	0.14	0.21

TABLE II

Wool Piece Goods Scouring—Mineral Oil
Effect of Varying Synthetic Organic Detergent Concentration

Scouring Conditions—Same as in Table I except that each piece of fabric is given *10 immersions.*

Expt. No.	Composition of Scouring Bath	Residual Oil (%)
1	Blank—not scoured	3.94
2	0.1% Synthetic Detergent	3.87
3	0.2% Synthetic Detergent	0.89
4	0.1% Synthetic Detergent + 0.3% Soda Ash	2.12
5	0.2% Synthetic Detergent + 0.3% Soda Ash	2.17
6	0.4% Synthetic Detergent + 0.3% Soda Ash	1.80
7	0.6% Synthetic Detergent + 0.3% Soda Ash	1.14

TABLE III

Wool Piece Goods Scouring—Mineral Oil
Effect of Varying Type and Amount of Alkali

Scouring Conditions—Same as in Table I except that each piece of fabric is given *10 immersions.*

Expt. No.	Composition of Scouring Bath	Residual Oil (%)
1	0.2% Synthetic Detergent + 0.02% Soda Ash	1.88
2	0.2% Synthetic Detergent + 0.05% Soda Ash	2.32
3	0.2% Synthetic Detergent + 0.10% Soda Ash	2.34
4	0.2% Synthetic Detergent + 0.10% Sodium Bicarbonate	0.72
5	0.2% Synthetic Detergent + 0.10% Borax	1.71
6	0.2% Synthetic Detergent + 0.10% Modified Soda	2.26
7	0.2% Synthetic Detergent + 0.20% Sodium Tetraphosphate	2.27

TABLE IV

Wool Piece Goods Scouring—Mineral Oil
Effect of pH on Scouring Ability

Scouring Conditions—Same as in Table I except that several consecutive strips are scoured through the same bath, each strip receiving *10 immersions.*

Expt. No.	Composition of Scouring Bath	pH	Residual Oil (%) Wool Sample No. — 1	2	3	4	5	6
1	0.2% Synthetic Detergent plus	7.0	0.89	2.82	3.47	—	—	—
2	Borate-HCl Buffer	7.15	0.34	0.41	0.60	0.93	1.07	1.62
3	Borate-HCl Buffer	7.5	0.46	0.53	0.61	0.78	0.93	1.07
4	Borate-HCl Buffer	8.0	0.49	0.40	0.39	0.43	0.51	0.65
5	Borate-NaH_2PO_4	8.0	0.83	0.88	0.78	1.09	1.09	—
6	0.1% Sodium Bicarbonate	8.1	0.72	—	1.52	1.96	—	—
7	0.2% Sodium Tetraphosphate	8.2	2.27	2.22	2.13	1.87	2.00	1.82
8	0.2% Disodium Phosphate	8.5	1.08	0.99	0.98	1.00	1.21	1.26
9	0.1% Borax	9.1	1.71	—	2.44	2.23	—	—
10	0.1% Sodium Sesquicarbonate	10.0	2.26	—	2.12	1.90	—	—

vious from Table I that in the scouring of mineral oil fabric 10 immersions and passages through the squeeze rolls are adequate when using 0.2% synthetic detergent. For this reason 10 immersions was adopted as standard for future experiments in the processing of mineral oil fabric.

Part B of Table I indicates that the scouring of lard oil fabrics may be accomplished with relative ease either with the synthetic detergent by itself or with added low concentrations of alkali. Five immersions of the fabric samples are adequate. The remainder of this investigation was devoted entirely to the study of the optimum conditions for the removal of mineral oil lubricants.

Effect of Varying Synthetic Detergent Concentrations

It will be noted in Table I that the synthetic detergent by itself was more effective for the removal of mineral oil lubricants than its combination with 0.3% soda ash. The effect of varying the synthetic detergent concentration while holding the soda ash concentration constant at 0.3% is presented in Table II. Here it is evident that as the synthetic detergent concentration is increased from 0.2-0.6% a gradual improvement in scouring ability is obtained. It was considered, however, that this improvement was not great enough to provide a final solution for the problem.

Effect of Varying Type and Amount of Alkali

Reference to Table III indicates that as the concentration of soda ash is increased from 0.02-0.10% the quality of scouring with a 0.2% solution of the synthetic detergent decreases. This suggested the possibility that the removal of a mineral oil lubricant with the synthetic detergent might be more effective under lower pH conditions than those exhibited by soda ash. In experiments 4-7 a selection of such alkalis is presented. It is of interest to note that excellent mineral oil removal was obtained with the use of sodium bicarbonate which exhibited pH = 8.1. It was thus indicated that a more thorough survey of the pH conditions in the scouring baths should be made.

Effect of pH on Scouring Ability

Even though satisfactory removal of mineral oil from the woolen fabrics may be obtained with a synthetic detergent at a given pH value in the scouring solution it is reasonable to assume that this pH value should be maintained relatively constant in order that a uniform grade of scouring may be obtained over a period of time. This would be of greater importance in the operation of continuous scouring machines than in batch operations in a dolly washer. In Table IV it will be noted that 6 consecutive samples of fabric were scoured through the same bath in order that the scouring ability might be studied over an extended period. In experiment 1 at pH 7.0 using 0.2% synthetic detergent the scouring efficiency is lost rather rapidly. Only one wool sample was scoured satisfactorily. It will be noted, however, that as the pH of the scouring solution was increased gradually from 7.0-8.0 the scouring ability was increased markedly to a point where the sixth consecutive sample was scoured as

TABLE V

Wool Piece Goods Scouring—Mineral Oil
Effect of Sodium Chloride on the Scouring Ability of Synthetic Detergent

Scouring Conditions—Same as in Table IV

Expt. No.	Composition of Scouring Bath	Residual Oil (%) Wool Sample No. — 1	2	3	4	5	6
1	0.2% Synthetic Detergent	0.89	2.82	3.47	—	—	—
2	0.2% Synthetic Detergent+0.10% NaCl	0.75	0.85	0.91	1.41	1.71	1.73
3	0.2% Synthetic Detergent+0.20% NaCl	0.34	0.41	0.71	0.87	1.49	1.72
4	0.2% Synthetic Detergent+0.277% NaCl*	0.32	0.43	0.52	0.89	1.11	1.59
5	0.2% Synthetic Detergent+0.50% NaCl	0.36	0.55	0.83	1.29	1.93	2.34

* This amount of NaCl corresponds to the quantity of NaCl formed at pH =7.5 with borate-HCl buffer used in Experiment 3, Table IV.

TABLE VI

Wool Piece Goods Scouring—Mineral Oil
Dolly Washer Tests

Fabrics—Wool Blanket Materials—4–5% emulsified mineral oil lubricant.
Weight of Fabrics—450–550 lbs.
Scouring and Rinsing Temperature—110°F.
Formula—20 min. scour
5 min. rinse
20 min. scour
45 min. continuous rinse

Expt. No.	Scouring Supplies Based on weight of Liquor	pH	Residual Oil (%)
1	0.40% Synthetic Detergent	7.6	2.74
2	0.55% Synthetic Detergent	7.6	0.00
3	0.4% Synthetic Detergent+0.4% NaCl	7.5	0.42
4	0.4% Synthetic Detergent+0.4% Na_2SO_4	7.5	1.34
5	0.4% Synthetic Detergent+0.4% Na_2CO_3	8.4	0.73
6	0.4% Synthetic Detergent+0.4% Borax	8.6	0.92
7	0.4% Synthetic Detergent+0.4% Modified Soda	9.3	0.92
8	0.4% Synthetic Detergent+0.35% $Na_3PO_4.12H_2O$	9.7	1.70

efficiently as the first sample for all practical purposes. As the pH of the scouring solution was increased from 8.0-10.0 the scouring efficiency decreased. This, however, was not a regular decrease and indicated that the type of alkali used to obtain a given pH value exerted a marked effect on the scouring efficiency. When comparing experiments 4 and 5 at pH = 8.0 greater scouring efficiency is obtained from the borate-hydrochloric acid buffer than from the borate-monodisodium phosphate buffer. This point is again emphasized when experiments 6 and 7 are compared at pH = 8.1 and 8.2, respectively. Greater scouring efficiency is obtained with sodium bicarbonate than with sodium tetraphosphate. In experiment 8 at pH = 8.5 with disodium phosphate greater scouring efficiency is obtained than at pH = 8.2 with sodium tetraphosphate. These data serve to indicate that a "salt effect" is being obtained which appears to have as important a bearing on the scouring efficiency as the pH effect.

Effect of Sodium Chloride on Scouring Ability

Experiments 2, 3 and 4 in Table IV were conducted with Sorensen buffer solutions prepared with sodium borate and hydrochloric acid. It was realized that this buffer solution supplies a considerable amount of sodium chloride in the scouring bath and it was felt that the effect of sodium chloride on the scouring ability of the synthetic detergent for the removal of mineral oil lubricants should be investigated. These data are presented in Table V.

The concentration of sodium chloride in the buffer solution at pH = 7.5 was 0.277%. This concentration is shown in experiment 4, Table V, and is bracketed by higher and lower sodium chloride concentrations. It is obvious from Table V that the presence of sodium chloride exerts a definitely beneficial effect on the wool piece goods scouring ability of this synthetic detergent. Under present scouring conditions where 0.2% synthetic detergent is used the optimum sodium chloride concentration is in the neighborhood of 0.25%. If the sodium chloride concentration is increased to 0.5% a less efficient scouring performance is obtained. More recently it has been demonstrated in full scale mill scouring experiments that as the concentration of the synthetic detergent is increased the concentration of sodium chloride should also be increased to provide the best scouring results. In full scale practice 0.5% sodium chloride appears to be nearly optimum.

Full Scale Piece Goods Scouring Tests—Dolly Washers

Full scale scouring tests in dolly washers provided a good practical confirmation of the laboratory scouring results outlined above. The only major change in scouring technique was that of giving the fabrics a double scouring treatment rather than the single scour used in the laboratory. This was necessitated because of the lower goods-liquor ratio and the larger resulting proportionate amount of oil that must be removed. Data representative of practical scouring results obtained in several mills with different types of fabrics are presented in Table VI.

Experiments 1 and 2, Table VI, reveal that 0.4% of the synthetic detergent is not sufficient for adequate oil removal, but that 0.55% is satisfactory.

Experiments 3-8 indicate that the scouring efficiency of 0.4% synthetic detergent may be improved to a satisfactory level by the use of the same builders which were effective in the laboratory investigation. Notable among these builders are sodium chloride and sodium bicarbonate. A smaller improvement is obtained with borax and modified soda (sodium sesqui-carbonate) while the improvement obtained with sodium sulfate and trisodium phosphate is not large enough to be of interest.

Full Scale Piece Goods Scouring Tests—Continuous Scouring Machines

Full scale scouring tests conducted with this synthetic detergent in continuous scouring machines have also confirmed the laboratory scouring data as well as the Dolly washer tests presented in Table VI. Under these conditions it has also been noted that effective removal of emulsified mineral oil lubricants may be obtained with the synthetic detergent by itself if an adequate concentration is maintained in the scouring boxes. It has been noted, however, that the synthetic detergent concentration may be markedly reduced in the presence of suitable builders such as sodium chloride or sodium bicarbonate. In continuous scouring machines the removal of animal and vegetable oil lubricants may be accomplished most effectively and economically with a combination of synthetic detergent and soda ash or some other suitable alkali.

Summary

Tests conducted in laboratory scouring equipment as well as in dolly washers and continuous scouring machines have indicated that "Nacconol" NR is a very efficient scouring agent for the removal of emulsified mineral oil lubricants from wool piece goods. The synthetic detergent may be used by itself to remove the mineral oil compositions or may be built with suitable salts such as sodium chloride or sodium bicarbonate. Best scouring results are obtained under neutral or slightly alkaline conditions. High alkalinities should be avoided. The type of salt used as a builder for the synthetic detergent has an important bearing on the scouring efficiency.

Non-Cellulosic Fibers Group Meeting—

Scouring Wool Raw Stock with a Synthetic Organic Detergent*

O. M. MORGAN

New Products Division

National Aniline Division, Allied Chemical & Dye Corporation

Abstract

The physical and chemical properties of Nacconol NR, a synthetic organic detergent, lend themselves conveniently and economically to the scouring of all types of wool and mohair raw stock. Improved analytical methods for the determination of this synthetic detergent have been very helpful in establishing proper scouring controls and have allowed for extreme simplification of the wool raw stock scouring process. In most instances the foam produced by the synthetic detergent on the surface of the scouring solution provides a sufficiently accurate control for the synthetic detergent concentration. Alkali concentrations may be controlled by periodic pH measurements. The use of a constant feed of slightly causticized soda ash stock solution is recommended for the control of bicarbonate alkalinity.

The scouring of pulled wools, which contain appreciable quantities of lime, is greatly simplified by the use of this lime stable synthetic detergent and scouring costs are markedly reduced.

FIFTEEN years ago woolen mill executives considered synthetic organic detergents as luxuries. They were used only in special applications where their cost could be justified. Very little time was spent in examining their ability to scour wool raw stock because, even if successful, their cost would have been prohibitive. These early investigations did reveal, however, that the synthetic detergents were effective as raw wool scouring reagents, but that their method of application might be slightly different from that of soap.

During this fifteen year period much has happened in the synthetic detergent industry. An ever increasing demand for synthetic detergents by the textile industry has been paralleled in paper, leather, dairying, metal cleaning, household and many other applications. The more effective products have reached the mass production stage which in turn has served to reduce the price to the consumer. Fifteen years ago the synthetic detergents cost 5 times as much as soap; today they are cheaper than soap. The same mill executives who once considered the synthetic detergents as luxuries now would find it difficult to operate their mills economically without them. No longer do these items search out specialized high priced applications. They are used effectively and economically in practically every wet processing operation in the woolen mill.

Many mills have adopted the synthetic detergents for the scouring of wool raw stock. The present discussion describes optimum methods for the application of one of these synthetic detergents, "Nacconol" NR†.

Principles of Wool Scouring

The scouring of wool raw stock is a relatively simple problem when a synthetic organic detergent is used. A rather small portion of the soil which must be removed from raw wool consists of water soluble materials. The great bulk of the soil is water insoluble and consists of wool grease and inorganic materials including sand, dirt, and lime. The wool scouring process is required to remove these materials to provide a clean fiber suitable for further processing.

Although the wool fats and dirt may be removed with the synthetic detergent by itself it is more economical and efficient when used in conjunction with a suitable alkali such as soda ash. Wool is a fairly sturdy fiber which may be processed within rather wide limits of acidity and alkalinity. It should, however, be protected against excessively high temperatures and rough mechanical action since these conditions tend to felt the fibers.

"Nacconol" NR is ideally suited for the scouring of wool raw stock. It is not affected by lime. Its scouring action is rapid. It provides for rapid wetting of the wool by the alkaline scouring liquors; aids in the removal and emulsification of the wool grease and in addition to being rapidly rinsable in its own right, it accelerates the rinsing of the alkali from the wool. A rapid, efficient and economical wool scouring process is provided.

Scouring Equipment

The grease wool is passed through a mechanical opener which pulls the fleece apart thereby allowing it to make more rapid contact with the scouring liquors. In long scouring trains consisting of 5 or 6 bowls the wool may be steeped in water in the first 1 or 2 bowls, following which it passes through 2 scouring bowls and 2 rinsing bowls. This represents an ideal scouring arrangement. As a general rule, however, much shorter scouring trains are found in the mills. These usually consist of 3 or 4 bowls and are generally divided into 2 scouring bowls and 1 or 2 rinsing bowls. Some of these shorter scouring trains are operated with a counter-flow arrangement whereby warm water is introduced into the last or second last bowl at a constant rate and flows from bowl 3 to bowl 2 to bowl 1 and thence to the sewer. This helps to keep the scouring liquors fresh. When working with a counter-flow system it is best to maintain a

* Presented at Non-Cellulosic Fibers Group Meeting, Robert C. Anderson, Presiding, National Convention, Chicago, October 24, 1947.

† Trademark "Nacconol" registered U. S. Patent Office by Allied Chemical & Dye Corporation. The statements made herein with respect to "Nacconol" NR are expressions of the author's opinion, based upon careful tests and investigations, and are not warranties.

constant rather than a periodic feed of scouring supplies.

The wool passes through squeeze rolls as it travels from one scouring bowl to the next and finally through a set of squeeze rolls into the dryer. If adequate rinsing facilities are not provided and the dryer is operated at too high a temperature, there is a tendency for the wool to become yellow. By facilitating rinsing of alkali from the wool the use of the synthetic detergent allows the dryer to be operated at a slightly higher temperature without damaging the wool and at the same time increasing the production rate.

Synthetic Detergent Control

When starting a raw wool scouring train the scouring bowls are charged with adequate quantities of synthetic detergent and soda ash. As scouring progresses the synthetic detergent concentration is gradually depleted. Part of it is sequestered in the wool grease emulsions while another portion satisfies the adsorption or absorption characteristics of the wool. This is true, to greater or lesser extents, for any surface active agent used as a raw wool scouring reagent. Although the residual grease content of the scoured wool is the ultimate criterion of efficient scouring it is important to know what is happening to the synthetic detergent as far as its gradual removal from the scouring solution is concerned.

Through experience it has been recognized that good scouring results were generally obtained when an adequate synthetic detergent suds was maintained on the surface of the scouring liquors. When the suds disappeared, the quality of scouring was reduced. The scouring solutions could then be rejuvenated by the addition of more synthetic detergent. Recently an improved analytical method *(1)* for the determination of this surface active agent has made an important contribution to the control of wool scouring processes. By applying this method to the analysis of wool scouring liquors it was possible to follow the "Nacconol" NR concentration as scouring progressed.

The analytical data for the synthetic detergent concentration provided by this method, when correlated with the foaming characteristics of the scouring solutions as well as the residual grease content of the scoured wool, have proved that the maintenance of a proper suds level combined with proper alkali control assures high quality scouring results.

Alkali Control

The alkali which is used in wool scouring is consumed by fatty materials in the wool as well as by acidic soils carried into the system by the wool. A certain amount of the alkali is also dragged out of the bath physically by the wool. The amount of alkali that should be added to the scouring bowls may be estimated by pH determinations or by titrations, or both. Care should be taken to avoid serious build up of bicarbonate alkalinity and this particularly in the first scouring bowl where the acidic materials in the wool convert sodium carbonate to sodium bicarbonate. The pH of sodium bicarbonate falls in the range 8.0-8.5 while the pH of sodium carbonate is in the range 9.5-11.0. The sodium bicarbonate which is formed acts as a buffer and reduces the pH of the system which still contains appreciable quantities of sodium carbonate. This reaction may be reversed by using a stock solution of mildly causticized soda ash as a constant or periodic feed for the scouring bowls. The small amount of caustic soda which is added serves to convert the bicarbonates to carbonate thereby improving the general scouring ability of the system.

[1] Jones, J. H., Journal of the Assoc. of Official Agric. Chemists, 28, 399-409, May 15, 1945.

TABLE I

Scouring Grease or Pulled Wool
Details of Charging & Maintaining Scouring Solutions
Production Rate—1200–2000 Lbs./Hr.

				Scouring Supplies				
				At Start		Continuous Feed		
Bowl No.	Operation	Vol. of water (gal.)	Temp. °F.	Nacconol NR (lbs.)	Soda Ash (lbs.)	Nacconol NR lbs./hr.	Causticized Soda * Ash-Lb./hr	pH
1	Scour	2800	120	35	110	6-15	10-30	9.5-10.5
2	Scour	2800	130	35	110	6-15	10-30	10.5-11.0
3	Rinse	2200	130	—	—	—	—	—
4	Rinse	1500	110-120	—	—	—	—	—

* *Causticized Soda Ash Stock Solition*

Soda Ash	300 lbs.
Caustic Soda Flakes	30 "
Water to	525 gal.

TABLE II

Scouring Grease Wool
Establishment of Proper Scouring Conditions

3 Bowl Scouring Train — 1200 lbs. Wool/Hr.

Time (Hrs.)	Nacconol NR (%) Bowl 1	Bowl 2	Suds Bowl 1	Bowl 2	pH Bowl 1	Bowl 2	Residual Grease (%)
0	0.15	0.15	High	High	10.6	10.5	0.40
1	0.11	0.13	Med.	Med.	10.1	10.5	0.42
2	0.09	0.11	Low	Low	10.0	10.5	0.91
3	0.06	0.09	Low	Low	9.9	10.4	1.36
4	0.16	0.21	High	High	9.5	10.3	0.45
5	0.16	0.20	"	"	9.3	10.0	0.62
6	0.15	0.22	"	"	9.0	9.8	1.19
7 *	0.16	0.21	"	"	10.0	10.5	0.52
8	0.17	0.23	"	"	10.1	10.6	0.43
9	0.16	0.22	"	"	10.1	10.5	0.45
10	0.15	0.21	"	"	10.1	10.5	0.46

* Start feeding causticized soda ash stock solution to maintain pH as shown.

Scouring Data

Extensive full scale wool scouring trials have been conducted under a variety of mill conditions. The data which follow serve to provide a general picture of the scouring results which may be expected when using "Nacconol" NR with soda ash and causticized soda ash.

Supplies for Scouring Bowls

Table I provides general information regarding the chemical supplies needed to charge and maintain a 4-bowl scouring train for either grease wool or pulled wool. The quantities of synthetic detergent used to charge the scouring bowls represent a concentration of 0.15% based on the weight of the liquor while the soda ash charge represents a concentration of 0.50%. The quantities of these supplies required as periodic additions or as a continuous feed will be variable depending on the type and amount of wool being scoured. If the wool is extremely greasy larger quantities of synthetic detergents will be needed. If the wool carries considerable quantities of acidic material, larger quantities of alkali will be required. It has been found that the best scouring performance is obtained by maintaining sufficient synthetic detergent in the scouring bowls to provide a good running suds on their surfaces. By operating in this manner, determination of the synthetic detergent concentration by chemical analysis is unnecessary.

Most efficient scouring is obtained when the pH of the first scouring bowl is maintained in the range 9.5-10.5 and the sec-

ond scouring bowl in the range 10.5-11.0. A considerable economy in the amount of soda ash required may be effected through the use of mildly causticized soda ash stock solutions for continuous or periodic feeds.

Effect of Synthetic Detergent Concentration

The effect of decreasing synthetic detergent concentrations is shown in the first portion of Table II where the concentration was started at 0.15% and allowed to drop to 0.06%, the alkalinity being maintained as nearly constant as possible. Here it will be noted that below a synthetic detergent concentration of 0.09% in the first bowl the scouring efficiency dropped off rapidly.

Effect of pH

In the second section of Table II the synthetic detergent concentration was maintained constant while the alkalinity of both scouring bowls was allowed to drop. After the pH of the first scouring bowl dropped below 9.3 and the second bowl below 10.0, the scouring efficiency was reduced rapidly.

In the third section of Table II proper concentrations of both synthetic detergent and alkali were provided and the build up of bicarbonate alkalinity was halted by feeding a causticized soda ash stock solution. A very uniform and highly efficient grade of scouring was obtained.

Wool Scouring Supply Costs

By operating in the manner described in the last section of Table II it has been possible to demonstrate distinct economies in a variety of woolen mills. These economies are summarized in Table III. As a general rule, previous supplies used by these mills were soap and soda ash. In some instances a small amount of synthetic detergent had been used to replace a portion of the soap. It will be noted that a supply cost saving of the order of 30% was demonstrated in most cases. The saving of better than 80% demonstrated in one mill may be attributed partly to a saving in supply cost and partly to a major change effected in the regular scouring procedure. These circumstances were unique and would seldom be encountered in a mill doing regular work. In each of these tests 6,000 to 10,000 pounds of wool was processed.

Summary

When a synthetic detergent, "Nacconol" NR, is properly applied in the scouring of grease wool or pulled wool, high quality scouring may be obtained at a definite economy. The control of this scouring process is simple and may be adapted to any existing type of scouring train. Mills which once considered synthetic detergents to be too expensive for use except in highly specialized applications now consider that they cannot operate economically without them. This has been an interesting chemical evolution which has aided in "Blazing Trails to Better Textiles."

TABLE III

Actual Raw Wool Scouring Supply Costs

Mill No.	No. of Scouring Bowls	Type of Wool	Scouring Cost/Lb. of Wool — Previous Supplies	Nacconol NR —Soda Ash	Supply Cost Saving (%)
1	3	Grease	$0.00336	$0.00235	18.1
1	3	Grease	0.00433	0.00290	33.0
1	3	Pulled	0.00570	0.00380	33.3
2	3	Grease	0.02360	0.00430	81.8
3	6	Grease	0.00470 *	0.00290	38.3

* Estimated.

Discussion

Chairman Anderson: Are there any questions on either one of these parts of Dr. Morgan's talk?

From the Floor: I would like to know what the analytical procedure is.

Dr. Morgan: This method was published by Jones in the Journal of the Association of Official Agricultural Chemists in May, 1945. It involves the ability of the synthetic detergent to combine with Methylene Blue to give an extractable colored complex. You then set up color standards and compare the unknown extract with the standards. It is very accurate and you can work down to very low concentrations.

From the Floor: Is that the same analytical method or a modification that came from your organization?

Dr. Morgan: No. This is a different method. The Methylene Blue Method is quantitative and quite fast, considering the results you get.

From the Floor: That is a general method?

Dr. Morgan: It will work for sulfates and sulfonates. The others I don't know about because I have never tried them. The article that describes the method gives you a lot of those details and tells you what will interfere. With it you can work up to fairly high concentrations of soap without serious interference and that is a great boon because soap is apt to be present in many instances. The surface tension method isn't good enough when soap and synthetic detergent are present at the same time.

Dr. Draves: I noticed that in your Tables 4, 5 and 6 you showed how the scouring efficiency of successive strips of new pieces of wool dropped off with variations in the salt concentration and variations in the pH. Did you make any quantitative studies of the rate at which the detergent is removed from the solution by the pieces of wool as you dipped them?

Dr. Morgan: Yes, we did. We are not quite ready to talk about that yet.

Dr. Draves: It seems to me there is a relationship.

Dr. Morgan: There is a relationship but it is a confusing relationship. It appears to be tied up with absorption and desorption, if you know what I mean. We hope to have something to publish on that before too long but the whole thing is in the stage of experimentation right now and anything I would tell you would be a guess.

Dr. Draves: I was making the prediction, as you gave your paper, that if you tried sodium phosphate, it would work better than sodium chloride, but it doesn't.

Dr. Morgan: You have a salt effect in this system which has a bearing on scouring results. It is a little complicated. We still have quite a bit to do on that.

Dr. Draves: One way is to reduce the affinity of your synthetic detergent.

From the Floor: You don't say anything about the merits of using Nacconol in combination with soap or about using it where they do have lubrication as in animal and vegetable oils. Now, lard oil, which theoretically might be very easy to remove, as a matter of fact is always considered difficult to remove under almost any circumstances.

Dr. Morgan: We have never had a great deal of difficulty in removing lard oil with Nacconol and soda ash or an alkali of some sort. You really asked me three questions.

From the Floor: The general standard practice is to use a lubricating oil of twenty percent detergent oil, twenty percent lard oil and sixty percent mineral oil.

Dr. Morgan: I am familiar with that combination. You can take it out either way. You can either take a neutral Nacconol NR which acts by itself, or save a little expense by building it either with salt or sodium bicarbonate. Now, under those circumstances, soda ash doesn't work quite as well as these other things, in

our experience.

From the Floor: With regard to this business of the building action of sodium chloride and bicarbonate in removing mineral oil: Have you any theories as to the action?

Dr. Morgan: That's what we are working on now. We have found out that it works and we want to find out why. And that is much more difficult than the job we have just done—the one I reported today. How long before we will be able to give you a report on that, I would hate to guess. It is something like the question of what is detergency and why does it happen. You have so many factors. You have absorption and desorption which I think play a rather important part and are connected very markedly with the different types of salt that you use as builders. So from there on we are still groping. We are trying to build up a background of data, and will try and sift from that the most relevant factors. However, in the meantime, this material is doing a swell job, which is most important, both scientifically and economically.

From the Floor: Going back to your first article and your first table, you gave the quantities for scouring conditions, but I forgot to note whether there was any mention as to the amount of wool that you put through in that period of time.

Dr. Morgan: That was set up for 1,000 to 1,600 pounds an hour, depending on the type of wool.

Mr. Walker: Apropos of that, do you calculate scouring per pound of wool or per pound of in-put or out-put?

Dr. Morgan: Per pound of input. That is the way it is generally calculated.

Mr. Walker: I know it is, but some people make other comparisons.

Dr. Morgan: Well, the comparison is going to be relatively the same whichever way you calculate it.

Chairman Anderson: Dr. Morgan, I would like to ask you a question on the first part of your paper dealing with the scouring of raw wool with a synthetic detergent. Would you say that this is more favorable or less favorable than scouring with soap on the spinning qualities or properties of the wool?

Dr. Morgan: That has been watched very carefully in the demonstration work I had to do in this. I do not know too much about spinning myself, and I have to take the word of the boss spinner or the superintendent. I can say that the spinning qualities were not affected in a bad way. I have had reports that the spinning was improved to some extent. There were no bad effects.

J. Robert Bonnar Elected Chairman, Research Committee

J. Robert Bonnar, technical director of General Dyestuff Corporation, who was elected chairman of the Research Committee of the AATCC at a recent meeting of the Council. In addition he was re-elected chairman of the Executive Committee on Research.

Following his graduation from Massachusetts Institute of Technology in 1927, Mr. Bonnar was with the American Printing Company, Fall River, Mass. In recent years, Mr. Bonnar has served as chairman of several Research Sub-Committees of the AATCC, and during the war was on a number of Task Committees.

Meeting, LTI Student Chapter

AT the January meeting of the Lowell Textile Institute Student Chapter Chairman Bianco announced plans for the joint meeting of the Northern New England Section and the Student Chapter. The meeting is to be held on April 16 and will be sponsored by the Student Chapter. Peter J. McKone is in charge of arrangements and has the following student members working with him:

Miss Joan Gregg, Dining Committee.
Miss Eleanor Foley, Finance Committee.
Allen Frank, Publicity Committee.
George Kenniston, Program Committee.

This is the second joint meeting of the Northern New England Section and this Student Chapter. The first meeting was held last May and was sponsored by the Northern New England Section. The student members hope to be able to duplicate the fine program of a year ago. The publicity and program committees are already at work soliciting students who wish to participate. The complete program will be announced at a later date and members of the Northern New England Section will be notified in the regular manner.

A program in the evening seminar series was presented on Tuesday, January 27. Dr. D. H. Powers of Monsanto Chemical Company spoke on "The Modern Role of Resins in the Textile Industry".

Respectfully submitted,

Lawrence C. Gardner, *Secretary.*

—♦ ♦—

Meeting, Philadelphia Section

A MEETING of the Philadelphia Section was held on January 9th at Kugler's Restaurant in Philadelphia.

Walter F. Fancourt, 3rd, was presented with a pen and pencil set by the new chairman, Arthur M. Gordon. A watch was presented to A. E. Raimo in appreciation of his many years of service as Secretary.

The new Officers and Committee Chairmen were all introduced to the section.

Motion pictures taken by George Altenbaumer of the Philadelphia Section at the Chicago Convention were exhibited.

Richard B. Stehle spoke on "The Application of Chemical Controls to Acid Dyeing" which paper took second prize at the Intersectional Contest in Chicago for the Philadelphia Section.

A question period followed led by M. H. Klein and all questions were expertly answered by Mr. Stehle. A prize awarded for these questions was won by James Dixon.

This meeting honoring our Intersectional Contest Committee was attended by 175 members and guests with 146 at the dinner preceding the technical sessions.

Respectfully submitted,

Thomas H. Hart, *Secretary:*

—♦ ♦—

Meeting, PTI Student Chapter

THE student chapter of the Philadelphia Textile Institute held its first meeting on Nov. 5, 1947 to decide where and when the meetings were to be held. It was decided to meet the first Thursday of every month and the meetings are to begin at 7:30 promptly.

The following officers were elected: Chairman, James Moran; Vice Chairman, Richard Mansfield; and Secretary, Miss Doris Mae McAllister.

The second meeting was held on December 4, 1947, at which Richard Stehle of Brehm and Stehle spoke on acid dyeing. Harry Morgan of James Lees and Sons was also present to answer a few questions. There were a few questions and

discussion after the talk and the meeting was then adjourned.

Respectfully submitted,
Doris Mae McAllister, *Secretary.*

Communication

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION
LOWELL TEXTILE INSTITUTE
LOWELL

January 15, 1948

American Association of Textile Chemists & Colorists

Gentlemen:

Lowell Textile Institute has established a central Placement Bureau to facilitate the efforts of industry to contact trained personnel. It will be the function of this Bureau to maintain a file of Lowell Textile Institute alumni as well as a file on the current graduating class which will indicate the training, experience, desired salary, etc. concerning all who might be interested in being placed in a new job.

At the same time, we are attempting to build up a file of jobs which might be available in industry in order to maintain a constant dynamic service in helping to fill these positions.

As we all know so well, the textile industry is so highly decentralized that it is a very difficult matter to bring to the attention of the entire industry this free service which we feel can be extremely useful. Therefore, we are writing you at this time to request your assistance in circularizing your membership as to the establishment of this Placement Bureau and extending an invitation to participate in its activities at any time.

If you should issue a release to your membership concerning this activity would you please ask each company that is interested to supply us with a description of the company, a description of the particular job or jobs which are available in terms of duties and starting salary and any other special requirements, and finally a brief statement as to the future which might be held forth to a successful applicant. This information will be of considerable assistance in determining the suitability and interest of any available personnel.

Will you also indicate to your membership to address all inquiries direct to James W. Bell, Assistant Director of the Placement Bureau, Lowell Textile Institute, Lowell, Massachusetts.

We will appreciate your assistance in this matter.

Very sincerely yours,
Simon Williams, *Dean.*

To Hold Annual Convention in Augusta, Ga.

PLANS are now being made for the 27th Annual Convention which will be held October 21-23 in Augusta, Ga. The tentative program includes three technical sessions, the annual Intersectional prize paper contest, a general Research Committee meeting, a dinner honoring corporate and charter members, presentation of the Olney Award for achievement in textile chemistry, and the annual banquet.

Dahlen and Theel on Exec. Committee on Research

DR. MILES A. DAHLEN, Organic Chemical Dept., E. I. duPont de Nemours & Co., Inc., and Prof. Percival Theel, head of Dept. of Chemistry & Dyeing, Philadelphia Textile Institute, were recently elected members of the Executive Committee on Research.

Membership Applications

SENIOR

Dwight F. Allen—Asst. Mgr., Davis Mills Corp., Screen Print Div., Fall River, Mass. Sponsors: R. H. Eaton, E. G. Parker.

Rudolph C. Born—Chemist, Perkins Soap Co., Springfield, Mass. Sponsors: H. M. Hartnett, W. M. Dewing.

James J. Curry—Supt. of Finishing, Standard Hosiery Mills, Inc., Burlington, N. C. Sponsors: R. H. Smith, S. G. Finley.

Felice J. De Maria—Chemist, James Lees & Sons Co., Bridgeport, Pa. Sponsors: H. F. Morgan, T. H. Hart.

Herschel I. Eisenman—Dyer, H. I. Eisenman, Inc., New York, N. Y. Sponsors: B. Lustig, R. G. Schwarz.

John A. Gaino—Dyer, Joseph Bancroft & Sons Co., Rockford, Del. Sponsors: A. L. Lippert, W. P. Hall.

William E. Harris, Jr.—Supervisor, Indust. Prods. Div., Pennsylvania Refining Co., Butler, Pa. Sponsors: W. D. Waters, C. Waters.

William M. Hemphill—Dept. Foreman, Joseph Bancroft & Sons Co., Rockford, Del. Sponsors: A. L. Lippert, W. P. Hall.

Walter M. Housch—Dyer, Dan River Mills, Danville, Va. Sponsors: S. H. Williams, W. B. Huntley.

Harry G. Kennedy—Salesman, Warwick Chemical Co., New York, N. Y. Sponsors: I. S. Hurd, W. E. Murray.

Fritz Neustaetter — Text. Technologist, Cantor Greenspan Co., New York, N. Y. Sponsors: F. Schuster, E. Freedman.

Elmer H. Rossin—Text. Research Chemist, Monsanto Chemical Co., Everett, Mass. Sponsors: E. S. Waters, R. F. Nickerson.

Frederick J. Tuohey—Dyer, Joseph Bancroft & Sons Co., Rockford, Del. Sponsors: A. L. Lippert, W. P. Hall.

Lawrence Volk—Owner, Lawrence B Volk Wholesale Garment Dyeing, Scranton, Pa. Sponsors: W. O. Neeb, T. H. Hart.

Richard C. Wood—Sales Engr., Antara Prods. Div., General Aniline & Film Corp., New York, N. Y. Sponsors: E. J. Geering, W. A. Wieland.

JUNIOR

Charles A. Bell—Asst. Colorist, Interchemical Corp., Textile Colors Div., Dyestuff Dept., Paterson, N. J. Sponsons. T. Rusticus, W. W. Chase.

Olen G. Boyd—Dyer, Tennessee Hosiery Mills Co., Niota, Tenn. Sponsors: J. W. Dooley, T. J. Marler.

Daniel K. Miller—Trainee, Export Sect., Organic Chem. Dept., Dyestuffs Div., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Sponsors: C. A. Seibert, J. W. Kilheffer.

ASSOCIATE

Charles H. Bronson—Research Asst., Tennessee Corp., College Park, Ga.

John J. Burke—Field Engr., Manhattan Rubber Div., Boston, Mass.

STUDENT

Harold F. Williams—New Bedford Textile Institute. Sponsor: F. Tripp.

Frederick R. Kern—Philadelphia Textile Institute. Sponsor: P. Theel.

EMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

47-40

Education: B.S., Rensselaer Polytechnic Institute; M.A., Columbia.

Experience: Organic chemist, petroleum inspector in Army of U.S., dyehouse chemist, formulation and testing of textile specialties.

Age 35; married; references; position in northeast U.S. desired.

48-1

Education: B.S., Rhode Island State College.

Experience: Chemist, print works.

Age 33; married; references; position in New England desired.

ABSTRACTS

Organo-Silicon Compounds

H. G. Emblem, The Dyer and Textile Printer, page 221, Vol. XCVIII, No. 5, August 29, 1947.

The organo-silicon compounds may be regarded as those compounds of silicon which contain one or more organic groups, whether or not the organic group is directly attached to silicon. Esters of silicic acid were obtained a century ago by the reaction between alcohol and silicon tetrachloride. These esters are now known commercially as "silicon esters". Most of the industrial uses of the silicon esters depend upon their property of yielding hydrated silica as the final product of hydrolysis. Modified silicon esters, containing a condensing agent, which renders the hydrolysis process easily controllable and reproducible, have been developed. Both the modified and unmodified esters are suggested as materials for the treatment of natural and synthetic fibers to increase slip resistance.

Silicones are prepared by the hydrolysis of organo-substituted silicon halides or silicon esters, followed by the condensation of the hydrolysis products. Silicon fluids may be used for waterproofing.

Textile fibers may be rendered waterproof by treatment with a mixture of organo-silicon halides or of organosilicon halides and silicon tetrachloride.

Characteristics and Application of Polyvinyl Butyral Coatings

D. S. Plumb, Textile Age, page 64, Vol. 11, No. 10, October, 1947.

Production of butyral coated fabrics has steadily increased since November of 1946. The most unique property of a vinyl butyral coating is its complete transparency and matte finished surface made with a comparatively dull coat. The surface is resistant to most common household stains and is completely waterproof.

The application of vinyl butyral coatings differs in few respects from coatings with nitrocellulose or rubber. A solution is made of a moderately flexible compound using a mixture of alcohol and naphtha as the solvent. This solution is applied to the fabric on a knife coater of the suspended knife or rubber roller type. More than one coat may be applied. Very finely divided Santocel (a silica) is added to the final coat which removes the gloss and all tendency to stick. The finished coating is subjected to hot air which vulcanizes the plastic.

The selection of proper dyestuffs and fabrics for proper coating is discussed.

Economy and Production in Screen Printing

The Textile Manufacturer, page 420, Vol. 73, No. 873, September, 1947.

In a properly organized mechanized screen printing plant, the printing operation proper governs the over-all output, and economies of printing time are the only source from which substantially increased output may be expected. A method is discussed which dispenses with woven gauze, the screen being based on a sheet of wires or filaments running parallel to the motion of the squeegee, and supported by a small number of wires or filaments running parallel with the edge of the squeegee and at right angles to the upper layer. Considerable saving in time may be accomplished. The drying period between printing of successive colors is the factor mainly controlling production rate in most existing plants. Two methods have been in use in keeping the printing apparatus continually at work: (1) using tables of considerable length, from 80 to 120 yds., so that more time is available for drying and (2) increasing the rate of drying by heating the table surface or the atmosphere. By a combination of continuous working, long repeats and use of double-width printing, the output of a screen printing table can be raised considerably. A drying carriage and a continuous system of working for multi-colour printing are described. A four-table printing department organized according to this system is equal to a plant of about fifteen tables.

Milling Shrinkage of Union Fabrics

C. S. Whewell and K. H. Messiha, Textile Recorder, page 48, Vol. LXV, No. 774, September, 1947.

The shrinkage potentialities of union fabrics are intricate functions determined by the nature of the component fibers, the type of yarn and the structure of the cloth. The present work investigates the shrinking powers of fabrics containing wool in admixture with "Fibro" and "Rayolanda". Results indicated that the shrinkage of fabrics after milling for a fixed time decreases as the amount of synthetic fiber decreases. Wool-"Rayolanda" fabrics shrink more than corresponding wool-"Fibro" fabrics. Fabrics containing longer staple fibers occasionally show greater shrinkage than corresponding fabrics made from two-inch staples but generally there is little difference. It is indicated that stronger fabrics of the milled type should be made from the longer staples.

Wool Fibers Under the Microscope

Eric Hardy, Canadian Textile Journal, page 36, Vol. LXIV, No. 21, October 17, 1947.

A low power microscope with its 2/3 inch and 1/6 inch panchromatic objectives, together with two powers of eyepieces and an Abbé condenser to control the illumination, is generally used in studying wool fibers. Directions are given for identifying the characteristics of wool fibers, mounting and examining specimens, collection of samples and the care of specimens mounted for permanent slides. The use of the microscope in studying synthetic fibers of the wool type is also discussed.

Sulfonation of Vegetable Oils (Turkey Red Oil)

I. S. Uppal, Indian Textile Journal, page 1016, Vol. LVII, page 683, August, 1947.

A study was made of the manufacture of Turkey Red Oil to determine optimum conditions for sulfonating castor oil. By raising the temperature of reaction and using even lower quantities of the acid than usually recommended, the time of reaction was reduced considerably. In addition to the simplicity of the method and a great saving in time and the cost of equipment, the method approved has the advantage of yielding always a uniform product irrespective of the weather changes.

A Practical Microbiological Laboratory

Francis Tripp, Textile Bulletin, page 36, Vol. 73, No. 4, October 15, 1947.

The purpose of this article is to provide practical suggestions for establishing a microbiological laboratory by making use of readily available materials and with minimum purchases of equipment. Directions are given for the construction of a sterilizer, incubator, set-up for leaching, device for obtaining the five replicate strips necessary for each test, culture cham-

bers, pure culture bank, sterilizer for glassware and needles and conditioning room.

New Applications of Color Measurement in the Dyeing of Wool

H. J. Selling, page 42, "Recent Advances in the Theory and Practice of Dyeing", Symposium of Society of Dyers and Colourists.

This paper is summarized as follows:

An investigation was made of the possibility of analyzing the amount of acid dyes on a woolen fabric as well as predicting the amount of dye necessary to match a given sample.

Included in the discussion of the investigation is an analytical method by which it is possible to evolve a dyeing formula based upon an estimation of the type and quantity of each dye present in a given sample.

In addition, equations are presented for the calculation of a dyeing formula which, starting from three known dyes on a given fabric, will match in daylight, a sample dyed with other dyes.

A New Reagent for the Identification of Vat Dyes: Acidified Potassium Permanganate

D. A. Derrett-Smith and B. C. Gee, page 27, "Recent Advances in the Theory and Practice of Dyeing", Symposium of the Society of Dyers and Colourists.

Four tests have been previously presented by Bradley and Derrett-Smith for the identification of vat dyeings on linen, cotton and viscose materials. The subject of this paper is a further test which consists of treating the dyed material with acidified potassium permanganate solution followed by an acidified solution of hydrogen peroxide. The use of this reagent in conjunction with the four tests presented previously provides confirmatory evidence as well as better differentiation in some cases.

Complete details are given with regard to the reagents and test methods. The results of tests using acidified permanganate are discussed. A number of tables showing dye color changes obtained with this reagent are included.

The Estimation of Diazo-Compounds through Decomposition by Light

G. Spencer and F. J. Taylor, page 21, "Recent Advances in the Theory and Practice of Dyeing", Symposium of the Society of Dyers and Colourists.

Although many diazo compounds can be readily estimated by the common coupling procedure there are some such as 1-diazo-2-naphthol-4-sulfonic acid and its 6-nitro derivative which couple slowly so that a tedious stirring and back titration are required, making the method slow and inaccurate.

It was found by Schmidt and Maier in 1931 that nitrogen could be evolved by exposing a diazo solution to bright sunlight. This same decomposition was accomplished by using an ordinary carbon arc as the source of light. This effect was used to develop a semi-micro apparatus and technique for the rapid and accurate determination of diazo compounds.

A diagram of the apparatus is given along with the method of operation and test procedure.

The Influence of Liquor Flow Rate in Package Dyeing

W. Armfield, page 10, "Recent Advances in the Theory and Practice of Dyeing", Symposium of the Society of Dyers and Colourists.

Since successful package dyeing depends upon the even distribution of the dye throughout the package a preliminary investigation was made of the liquor flow rate.

An apparatus for this study is described and a method is given for determining the levelness of a dye package, with complete levelness expressed as unity.

Using a number of direct dyes the effect of rate of flow was studied under two conditions: (a) with a constant dye liquor exhaustion and (b) with a constant electrolyte concentration. The method of dyeing for these conditions is given in detail.

It was found in all cases that the levelness factor was increased by increasing the rate of flow.

Less variation occurs when 50% exhaustion is obtained by controlling the electrolyte content and at one rate of flow than by dyeing with the constant addition of electrolyte.

The results indicate that the apparatus can be used for the classification of dyes with regard to package dyeing.

Test data is presented by means of several curves and tables.

Some Aspects of the Electrochemistry of Dyeing

S. M. Neale, page 1, "Recent Advances in the Theory and Practice of Dyeing", Symposium of the Society of Dyers and Colourists.

The electrical forces to be considered in the electro-chemistry of dyeing are the short range forces present in the covalent link or the hydrogen bond and the long range electrostatic forces as exhibited by the attraction between ions of opposite charge.

The short range forces determine the specific affinity of a particular dye for a particular fiber whereas the long range forces may either assist or oppose the short range forces.

Most direct cotton dyes and acid wool dyes are salts which dissociate into ions of opposite sign and it is indicated that only the color ion of the salt is absorbed by the fiber. It has been shown that all textile fibers have a negative potential in neutral solutions and therefore work has to be done in order to accomplish the absorption of a negative color by a negative fiber. The energy necessary to force the color ion past the long range force is supplied by the thermal agitation of the dye bath. Absorption of the color ion is completed by the anchoring effect of the short range forces of the fiber. The addition of a neutral salt to the dyebath reduces the negative potential of the fiber and aids in the absorption of a maximum amount of dye.

The converse of the above system is true in the case of a dye whose color ions are opposite in charge to the fiber and the addition of a salt tends to reduce the electrical attraction by reducing the negative potential of the fiber.

The natural negative charge of silk and wool can be reversed by using an acid dyebath and thereby cause an attraction between the fiber and a negative color ion.

Other research on various aspects of this subject is discussed.

The Problem of Fast Coloration of Cellulose Acetate Rayon, with Particular Reference to Fast-to-Scour Shades

A. Mellor and H. C. Olpin, page 23, "Recent Advances in the Theory and Practice of Dyeing", Symposium of the Society of Dyers and Colourists.

Cellulose acetate rayon may be dyed to shades which are fast to light and scouring by the use of azoic dyes. Azoic dyeings may be applied to effect threads and staple fiber as well as all-acetate fabrics. A typical dyeing procedure is given in which the base and naphthol are combined.

Azoic blues and greens are not fast to light with the exception of a few anthraquinoid dyes which, when coupled to suitable end components, give bright green shades. By using the halogenated derivatives of indigo satisfactory blues may be obtained.

Certain of the dispersed type dyes are suitable for the fastness to light dyeing of soft-furnishing fabrics. Through the proper selection of dyes and the use of inhibitors the gas fading problems encountered with these dyes can be eliminated.

The application of dyes to cellulose acetate rayon by means of organic solvents is discussed. A procedure for applying aniline black to this fiber is given.

• PATENT DIGEST •

Stabilizing Cellulosic Textiles, Glyoxal and Polyvinyl Alcohol G, 2, 04

Brit. P. 586,598
(Cluett, Peabody & Co., March 24, 1947)
Brit. P. 586,637
(Cluett, Peabody & Co., March 28, 1947)

The company obtained some time ago a patent for shrinkproofing textiles with a glyoxal solution to which an acidic catalyst had been added (Brit. P. 585,679, see U. S. Pat. 2,412,832 reported in AM. DYEST. REP. 1947, p. 337). It has now been discovered that this process can be improved by adding polyvinyl alcohol to the glyoxal solution. Glyoxal being in excess has the property of insolubilizing polyvinyl alcohol and to form a deposit upon the outer surfaces of the fibers which have been wetted with this finishing solution. The solution contains according to the specification 15-120 ml. glyoxal (30%) and 0.125 — 4 g. of an acidic catalyst per liter for example oxalic acid. Polyvinyl alcohol which may be represented by the formula:

$$\left[- \underset{\underset{OH}{|}}{CH} - CH_2 - \underset{\underset{OH}{|}}{CH} \; CH_3 - \right]_n$$

is obtained by hydrolysis of polyvinyl acetate. It reacts with glyoxal $(COH)_2$ to form a water insoluble compound in which two of the polyvinyl groups are linked to *one glyoxal group*. These higher molecular polyvinyl chains are supposed not to penetrate into the interior of the fibers and to remain on the surface where they are insolubilized. The effect is therefore a stabilizing as well as a stiffening one. The co-pending patent 586,637 discloses that a further improvement can be attained by adding a water soluble amino-formaldehyde pre-condensate to the above solutions. These condensates are composed from urea-formaldehyde or melamine formaldehyde. The amount of the condensates added to the glyoxal preparations, however, must not be as high as to give crush- or shrinkproof effects by themselves. An addition of a cation active softener which may be represented for instance by one of the "Zelan" ("Velan") products: alkylamidomethylene pyridinium salts is said to be advisable.

Reference is made to the aforementioned abstracts in AMERICAN DYESTUFF REPORTER 1947 p. 337). This patent relates to a shrinkproofing process with glyoxal by adding a water soluble, stabilized urea-formaldehyde condensate of the "Beckamine" type. Therefore this patent may correspond to the Brit. P. 586,637, named here in second place. Additions of "Zelan" type products to resin preparations for obtaining an anti-shrink effect have been suggested in U. S. Pat. 2,347,024 (Beer).

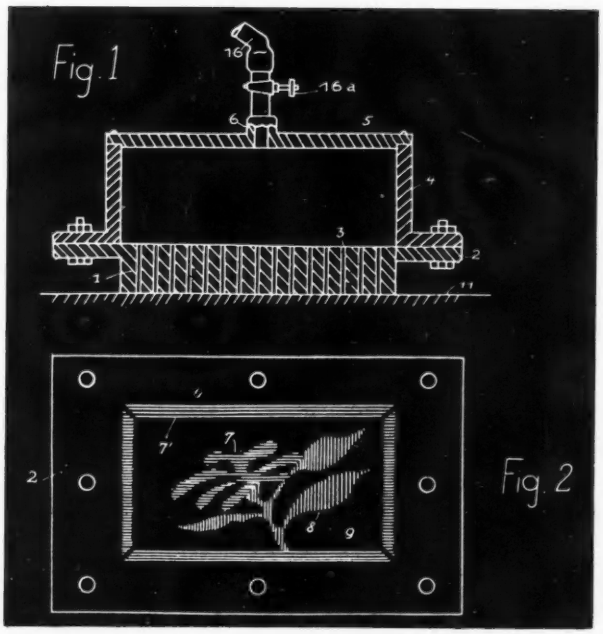
PAUL WENGRAF

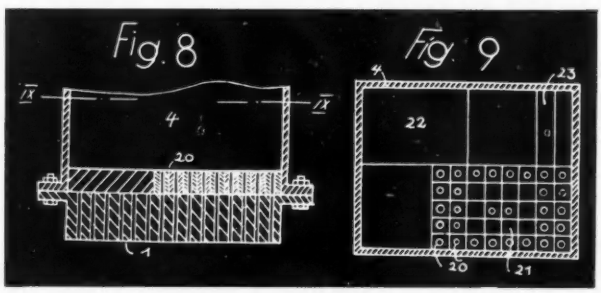
Printing Device (Screen printing, Omitting the Squeegee) D, 4

Brit. P. 587,087
(Oppenheim, April 14, 1947)

A very interesting attempt at modifying and improving screen printing methods has been described in this patent. The usual screen, covered with the pattern, is replaced by a device consisting of a form which is illustrated in Fig. 1. The bottom of this form (1) contains a great number of channels (3) which are in practice, of course, much smaller and much more numerous than those illustrated and almost of capillary size. The stencil is placed on top of (1) and covered with the printing ink. The lower part of the form (1) is thereupon closed with a flanged body (4, 5) fitted with a tubular connection (6, 16) which has the purpose of pressing air through the stencil. By changing the stencils multicolored patterns are obtained. Thus this device does not require the usual procedure with the squeegee. It has furthermore many advantages for producing small quantities of printed material. It is not quite sure whether this device is intended for textile printing at all but it can certainly be used for this pur-

Printing Device—B. P. 587,087.





pose. The apparatus can also be partitioned as illustrated in Figures 8 and 9 and in this respect a similar device for decorating fabrics, comprising a divided container with partitions, supplied with various printing pastes at the same time can be found in Brit. P. 486,478 (*Robissa*).

Creaseproofing Textiles, Dimethylolurea, Solubilized

G, 2, 04

Brit. P. 586,997

(American Cyanamid, April 10, 1947)

Textiles made from cotton, viscose, wool or blends thereof have been creaseproofed according to former methods by forming a resin *in situ* or by applying precondensates of mono- or dimethylolurea. Furthermore it has been suggested to use alkyl substituted methylolureas as finishing agents but generally these products are only soluble in organic solvents and therefore their use is rather expensive. The present method recommends using water insoluble urea- formaldehyde condensates solubilized by reacting them with a tertiary nitrogen compound. Water insoluble dimethylolurea ethers, for instance butyl-octyl-ester of dimethylolurea

C_4H_9 -OCH_2 - NH$\rangle$CO, C_8H_{17} -OCH_2 - NH$\rangle$CO, are reacted with pyridine hydro-chloride. The product is water soluble and by impregnating textile goods, drying and curing them at 260-270° F. a stiff, crease-resistant fabric results. Brit. P. 587,572 (same company, April 30, 1947) describes in a similar way water repellent finishes of the same type. Here the methylolurea compounds or the melamine - formaldehyde precondensates are high substituted (for instance stearylated methylolmelamine) and reacted with pyridine hydrochloride and formaldehyde. A water soluble powder results which gives after curing permanent water repellency to the fibers.

References: According to U. S. Pat. 2,371,892 (same company) alkylolmelamines alkylated with butanol or the like can be emulsified with small quantities of higher amines (example octadecoxy-propylamine). Creaseproofing textiles with urea-formaldehyde pre-condensates to which Turkey Red Oil is added (as a modifying agent?) are described in Perry Finlayson's Brit. P. 485,198.

Dyeing Apparatus, Vibrating Device

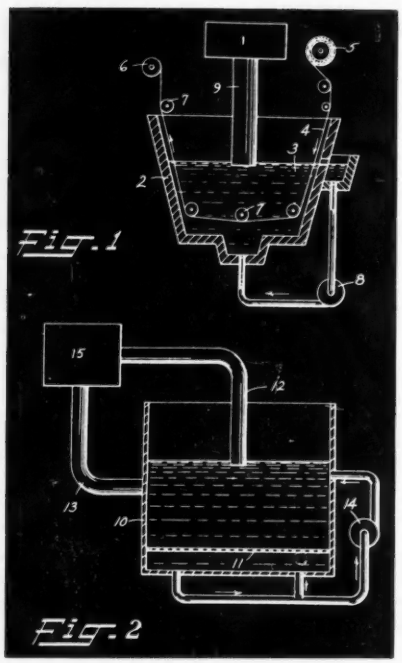
C, 6

Brit. P. 587,214

(Am. Viscose Corp., Woodruff, April 17, 1947)

The invention comprises an improved method of dyeing textile materials. It has been found that the even and thorough penetration of dyestuffs is facilitated by maintaining the bath and the material in permanent high vibration during the passage of the textiles through the dyebath. Textile materials being poorly penetrable under normal conditions are dyed by this method in a satisfactory way even in the absence of swelling agents by subjecting dyebath and material to vibrations of 1000-500,000 cycles per second. Sonic or supersonic waves may be directed on to the bath surface or into the bath itself. Under such conditions the dye is said to penetrate rapidly and uniformly through the fibers. The high frequency generator of the supersonic or uppersonic waves may be of any desired type. The apparatus pertinent to this method is illustrated in the accompanying drawing. The fabric passes a conventional dye-jig (Fig. 1). The supersonic waves are generated in (15) and conveyed to the dye-jig by two transmission tubes (12 and 13), the first one directing the waves on to the surface, the second one to the side wall of the apparatus, whereby the vibration is also imparted to the material itself.

Dyeing Apparatus—B. P. 587,214.



Reference: The principle of an oscillating dyeing machine has been described in U. S. Pat. 1,819,229 (Constant). Dyeing in a kind of jig where the center roller submerged in the dyeing liquid is subjected to regular vibrations has been suggested in Brit. P. 473,549 (I. G.). The first publication, however, recommending to dye wool felt at relatively low temperatures by causing a turbulent movement within the dyebath can be found in two Brit. P.: 441,660 and 436,875 (Imp. Chem. Ind.). This process was very much propagated by the company but up to now no definitely superior results have been reported in practice.

Aromatic Diamines, Fixation of Different Dyestuff Groups

C, 1

Brit. P. 590,536

(Stevensons Dryers, Lim., Partridge et al., July 21, 1947)

Aromatic diamines which on reacting with formaldehyde give insoluble condensates have been found capable of fixing dyestuffs on various textile fibers. Compounds, belonging to this group are, for instance:

p-Phenylene diamine.
Toluylene—2- 5- diamine.
Benzidine.
Tolidine and the like.

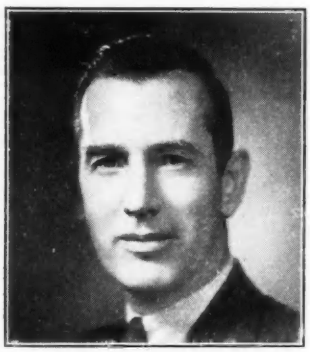
The fixation of the following dyestuff groups is said to be improved: direct, acid, acid mordant, Neolan (Palatine Fast) dyestuff, Indigosols and acetate dyestuffs. The diamines are first condensed with formaldehyde in acid or alkaline solution. The condensates may be applied to the fibers either before or after the dyeing process, preferably at elevated temperatures between 60-100° C. It is stated however that some of the dyestuffs undergo a considerable change of shade by this application. According to an example p-phenylene diamine is dissolved in 20 times its weight of water, hydrochloric acid and formaldehyde are added and the whole solution is boiled for three minutes and diluted with cold water. After neutralizing the mineral acid with sodium acetate and adding some acetic acid a piece of cloth, dyed in Chlorazol Green PLS is treated in this solution for 10 minutes at the boil, rinsed and dried. The shade of the dye is unaffected and the fastness to water has been substantially improved.

References: U. S. Pat. 2,375,124 (Courtaulds): the affinity of fibers to dyestuffs is increased by incorporating condensates of aryl guanidines with formaldehyde. The same company proposed to improve the fastness of dyeing by preparing aqueous solutions of aryl guanidines, formaldehyde, and acetic acid. Condensates of aldehydes and pyridine are bases of this group are known to increase the affinity of cellulose fibers to different dyestuff classes. See Brit. P. 426,482 (Hydrierwerke) and U. S. Pat. 2,120,267 (I. G.-Schirm).

TRADE NOTES • NEW PRODUCTS

• New Officers, du Pont Company

Crawford H. Greenewalt recently became the tenth president of E. I. du Pont de Nemours & Co., while Walter S. Carpenter, Jr., was elected chairman of the Board, it was announced following the regular monthly meeting of the Board of Directors. Mr. Carpenter's resignation as president, and his designation as chairman of the Board, followed the retirement of Lammot du Pont from the latter post. Mr. du Pont's action brings to a conclusion a career in the company that began in 1902, and one that played a large part in the expansion and diversification of the company's activities.



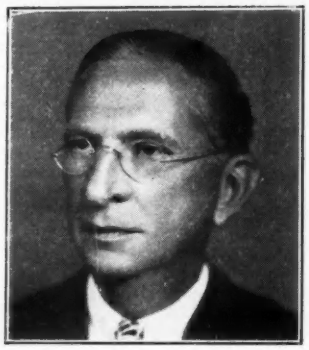
Crawford H. Greenewalt

In addition to assuming the presidency of the company, Mr. Greenewalt became chairman of the Executive Committee, of which he had previously been vice chairman.

Walter S. Carpenter, Jr.

Mr. du Pont will continue as a member of the Board, while Mr. Carptenter retains his membership on the Finance Committee.

At the same time it was announced that Walter J. Beadle, a vice president and member of the Board, had resigned as treasurer of the company and had been elected to membership on the Executive Committee. T. C. Davis, who had been first assistant treasurer, was elected treasurer to replace Mr. Beadle.



Lammot du Pont

The new president of the Du Pont Company is 45 years old, and joined the organization in 1922 as a chemist in the Philadelphia Works. Two years later he was transferred to the Chemical Department in Wilmington, becoming assistant director of the Experimental Station in 1939. He was made a director of the company in 1942, and in the same year became chemical director of the Grasselli Chemicals Department. After working on the atomic energy program carried out by du Pont for the government, he served successively as an assistant director of the Development Department, and as assistant general manager of the Pigments Department.

He was elected a vice president and member of the Executive Committee in 1946, and was made vice chairman of that Committee a year later. He was graduated from Massachusetts Institute of Technology with a bachelor of science degree in 1922.

Mr. Carpenter, the new Board chairman, has been president since 1940, bringing to the highest level a career with Du Pont that began in 1907 as a temporary vacation employee in the company's dynamite plants. He left Cornell in his senior year to work for Du Pont in Chile, and spent two years there. In 1911 he came to Wilmington as a member of the staff of the Development Department. Six years later he became director of that department, and in 1919 was made a director and member of the Executive Committee, and vice president in charge of the Development Department. He was 31 years old at the time.

Three years later he was elected treasurer of the company and a member of the Finance Committee. In 1926 he was made vice chairman of the Executive Committee, and in 1930 chairman of the Finance Committee. When he was made president in 1940, he was the second man not of the du Pont name in the company's history, running back to 1802, to head the organization. Antoine Bidermann was acting manager of the company for two and a half years following the death of the founder in 1834.

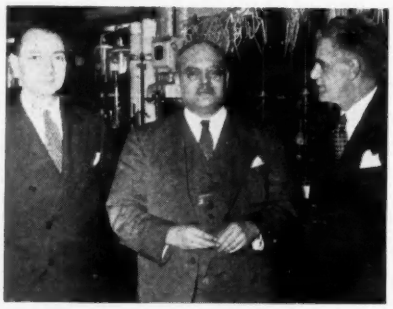
Lammot du Pont was the third of three brothers who served in turn as president of the company. The eldest brother, Pierre, was president from 1915 to 1919. Irenee occupied the post from 1919 to 1926, and Lammot from 1926 to 1940. To Lammot du Pont, youngest of the trio, fell the task of rounding out and coordinating an enterprise that, in little more than a decade, had been transformed from a company mainly interested in the production of industrial explosives to an organization manufacturing numerous products in the broad chemical field.

Mr. du Pont was born in 1880, and received his degree in civil engineering from Massachusetts Institute of Technology in 1901. He joined the company in 1902, and in 1913 had become general superintendent of the Black Powder Department. Two years later he became a director and member of the Executive Committee, and was elected a vice president in 1916, heading up the company's miscellaneous manufacturing activities, including dyes, plastics, paints, and chemicals.

• Speaks at Calco

Professor E. R. Schwarz of the Mechanical Engineering Department, Massachusetts Institute of Technology, recently addressed an assembled audience of research and administrative personnel at the Bound Brook, N. J., plant of the Calco Chemical Division, American Cyanamid Company.

Professor Schwarz is well known for his work in textile technology and for the many technical articles and books on this subject. When asked what new developments the industry can expect, Dr. Schwarz declared that he did not believe that new product development on the order of the new synthetic textile fibers and wool shrinkage control resins would be forthcoming in the near future. There will be, however, a better understanding of the chemical constitution of fibers and its effect on physical behavior. Relating this new knowledge to the consumer, Dr. Schwarz observed that better ultimate fabrics and better service will result from this new knowledge.



Shown with Prof. E. R. Schwarz on his recent visit to Calco are: K. H. Klipstein, left, and R. E. Sumner, right.

To the question, what steps are the technical colleges like M.I.T. taking to prepare the graduate to meet the present-day demands of our industrial society created by the merger of science and business, Dr. Schwarz stated that M.I.T. very early recognized the urgency of the problem and had prior to the war, worked out an arrangement with several colleges whereby students would take two years' work for their A.B. and would complete their studies at M.I.T. with three years in science and engineering. The student would then be awarded both his A.B. and B.S. degrees by both colleges under this arrangement. The program has been resumed but it is too soon to evaluate results according to Dr. Schwarz. He stated that their best prepared people come from two backgrounds, namely, the actual research field where the chemical engineer is found to have the best background due largely to its breadth and depth, and from those students in the field of business and engineering administration. There is, however, a need for a broader background in humanities.

• Zinsser & Company, Inc. Celebrate 50th Anniversary

Zinsser & Company, Inc., Hastings-on-Hudson, New York, celebrated its Golden Jubilee on December 11, 1947, with a dinner which was attended by 250 of its staff.

Two of its original employees with records of fifty years service, Frederick Zinsser, the present Chairman of the Board, and Walter Keech, the Chief Engineer, were honored by the company. Mr. Zinsser was presented with a replica of a silver punch bowl, the original being in the Royal British Museum, and Mr. Keech with a substantial check in addition to a Hamilton watch.

Similar watches were presented to each of the 35 employees, who have been with the Company for 25 years and who are Charter Members of the 25 Year Club, which was formed at this time.

• Vice-President, Textile Colors Division

William B. DePass, who, as noted in our December 15th issue, has been elected Divisional Vice-President of Interchemical Corp., Textile Colors Division, Fair Lawn, N. J.

The Zinsser plant is located on some 13 acres of water front property at Hastings-on-Hudson, where both the manufacturing and the administrative activities are carried on.

When first started, the company specialized in the manufacture of Tannic Acid and Hermatine products, which were soon followed by Photographic Developers, Dyestuffs, Dry Colors and Fine Chemicals, in which the company does a world wide business.

During World War 1, a Mustard Gas Plant was built for the Government and in World War 2, it contributed Anthraquinone Derivatives for tracer shells and bullets used by both Army and Navy.

Officials and employees are proud of the progress the company has made in the chemical field and hope to serve the chemical industry with the same faithfulness which has characterized its activities in the past.

• Gossett Lecture Series

B. B. Gossett of Charlotte, a retired textile manufacturer, has donated $10,000 to the School of Textiles at N. C. State College for the establishment of the "B. B. Gossett Textile Lecture Series," Dean Malcolm E. Campbell, head of the school, has announced.

Dean Campbell reported, however, that the lecture series will not begin until the completion of a new $450,000 addition to the School of Textiles Building as authorized by the 1947 General Assembly. The new structure will include a spacious auditorium and other features.

Under the lecture series plan, the School will invite top-ranking representatives from all branches of the textile industry to deliver lectures to the students. One lecture has been planned per month. Funds from the Gossett gift will be used to defray the speakers' expenses.

Dean Campbell said that he believes the students at the college will get a broader knowledge of all segments of the textile industry as a result of the lectures and demonstrations to be arranged under the Gossett program.

• Nyanza in New Quarters

Nyanza Color & Chemical Co., Inc., have acquired a new five story and basement building for their main office, laboratory and warehouse at 109 Worth Street, New York, and have been occupying these premises since the first of the year.

The new quarters are much larger and more modern than the former quarters at 215 Water Street, which had been occupied since the formation of the company. The office, comprising 5,000 square feet, is on the second floor and the laboratory, located on the third floor, covers the same area. Shipping and receiving facilities are maintained on the main floor and use the Catherine Lane entrance to the building.

The telephone numbers will remain BEekman 3-3245-6-7-8.

• Warwick Appointment

Ernest Nathan, President of the Warwick Chemical Company Division of Sun Chemical Corporation, announces the appointment of J. J. Whitfield as Sales Manager of the Stearate Division. Mr. Whitfield has been in charge of stearates sales in the metropolitan New York area for a number of years.

• Carbomatic Representatives

Carbomatic Corporation, manufacturers, Long Island City, N. Y. announce the appointment of Textile Specialties Co., Greensboro, N. C., as representatives to handle the sales and servicing of Carbomatic products throughout a territory embracing North Carolina, South Carolina, Virginia, Georgia and Alabama. The products are manufactured by Carbomatic's Infra-Red Division—a pioneer in infra-red radiant heat applications in the Textile fields, and which now manufactures a line of gas-fired and electric infra-red radiant heat equipment for virtually every type of textile heat-processing operation, including drying, curing, carbonizing and singeing units.

• New Bedford Scholarships

A donation of $5000 for scholarships has been granted New Bedford Textile Institute by Neuss, Hesslein & Co., one of the largest converting and exporting houses in the United States. The fund is to be known as "The Edgar and Emily Hesslein

Fund, Inc." The donation is given in their memory.

President of the Trustee Board, John A. Shea, is the New England representative of Neuss, Hesslein & Co. Members appointed to have charge of the detail of handling scholarship funds are:

Principal George Walker, *Chairman.*

President of the Trustee Board, John A. Shea.

Supt, of Schools, W. Kenneth Burke.

Trustee, Frederick Rollinson.

• Releases Trademark Rights to Saran

Donald Gibb, head of plastics sales division of The Dow Chemical Company, announced recently that his company has formally released its trademark rights to the name "saran" permitting it to become the descriptive name of the product. Mr. Gibb said the action was taken "in the interest of simplifying identification on various plastic materials whose chemical names have for years been confusing to press, trade and consumer alike."

The term saran applies to a series of thermoplastic resins chemically known as vinylidene chloride copolymers originally developed by Dow in the latter thirties and known especially for their resistance to a wide range of chemicals. Monofilaments of the plastic are currently becoming prominent in the textile field. Moisture repellent packaging films and corrosion resistant piping are other important uses of the plastic.

• Hooker Promotion

John P. Edwards has recently been promoted to the Sales Development Department of the Hooker Electrochemical Company, Niagara Falls, New York. He will handle technical correspondence with respect to the use and application of Hooker Chemicals by all customers.

Mr. Edwards is a chemical engineer by training, having been graduated from the University of Minnesota in 1940. Coming directly to the Hooker Company in that year, he has been associated with the Process Study Group.

• Flies to Scandinavia

John B. Wathey, vice president in charge of research and development for the Bocon Chemical Corporation, flew to Scandinavia recently at the request of Swedish textile mills to consult with plant chemists on developments in the mothproofing of woolens.

• Plan Education Program

What a sales engineer needs to know about foundry practices and what a machine designer needs to know about estimating and costs are some of the questions that will be answered in a new plant education program recently begun by H. W. Butterworth & Sons Company, Philadelphia.

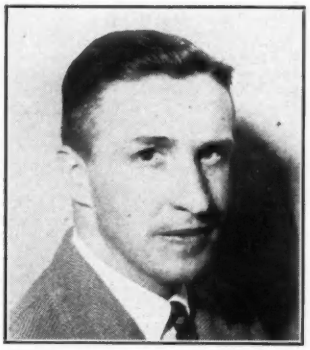
At weekly meetings, department heads and their assistants are learning about the building of Butterworth Machines—from the pattern shop and foundry to the erection floor.

The program got underway with a general meeting on post-war developments in textiles.

"We want each department to understand its part in the building of Butterworth Machines as well as the contribution made by every other department," says Charles Garrison, personnel director. "It's a matter of coordinated effort and no one can say that the time and motion study man is not not just as important as the sales engineer or a skilled designer.

The topics to be covered in the first ten meetings are as follows: (1) pattern shop and foundry practice, (2) developments in textile machinery, 3) sales engineering, 4) development of rayon machinery, (5) engineering procedures, (6) methods, (7) time and motion study, (8) quality control, (9) production control, (10) cost and estimating.

• Calco Sales Representative



The appointment of Cameron Mackenzie (above) as a sales representative in the New York Metropolitan District was announced recently by J. Pfister, Manager of the Dyestuff Department, Calco Chemical Division, American Cyanamid Company.

Mr. Mackenzie is a native of Providence, Rhode Island, and received his early education at the Providence Country Day School and the Lawrenceville School, Lawrenceville, New Jesrey. He obtained his A.B. degreee from Princeton University in 1940 and immediately joined the 44th Infantry Division as a Second Lieutenant. He served in the European theatre of operations and, after his release from active duty in February 1946, came to the Calco organization as a student trainee.

• Meeting, Quebec Section, CATCC

At the January dinner meeting of the Quebec section of the CATCC, held Jan. 17 at the Mt. Royal Hotel, Dr. Milton Harris presented a paper on "Some Concepts of Textile Fibers". Dr. Harris proved a master of his subject and his lecture was both entertaining and instructive. A long question period followed and many points were made clear.

In addition to record attendance from the Quebec Section, guests were present from Ontraio and from the Textile Society and Canadian Institute of Chemistry.

At the next meeting, to be held at McGill University on Feb. 21st, Dr. George L. Royer of Calco will speak on "Rayon Dyeing".

• Education on Lace Manufacturing Investigated

Five members of the faculty of Lowell Textile Institute were the guests of the American Lace Manufacturers Association during a two-day mill inspection tour on December 29-30, in a unique experiment in textile education and industrial cooperation.

The American lace industry, along with other highly specialized branches of the textile industry, is largely unknown to the public, to the rest of the textile industry, and certainly to the students of textile schools. Yet the lace industry is an important, highly significant branch of textiles. Faced with this problem, Edward F. Walker, Executive Director of the American Lace Manufacturers Association, approached Lowell Textile Institute in an effort to explore the possibilities of bringing into textile education a clear, precise, yet justifiably vivid story of lace.

As a result, Dr. Simon Williams, Dean, and Professors Chapin Harris, Vittoria Rosatto, Russell Brown, and Edward Golec, visited a group of lace mills in the Providence area, carefully reviewing the aspects of lace production and finishing to determine the best approach to the educational problem presented. It was concluded that lace manufacture was sufficiently complex to rule out any course work leading to the training of designers, draftsmen, or machine operators. Rather, it was felt that the primary job was one of presenting to students a clear, accurate picture of the size, methods, products, and relative position of the lace industry in the textile field, in order to interest them in making careers in the lace field and to give to all textile graduates a broader background in the over-all concept of textiles.

On this basis, plans are being studied for the development of a cooperative educational program involving field trips to the mills, special lecture and demonstration series to be integrated to existing courses, and the preparation of an authoritative but popular reference source for up-to-the-minute data on lace.

• Position Vacant at Naval Clothing Depot

There is a vacancy at the Naval Clothing Depot, 29th Street and 3rd Avenue, Brooklyn 32, N. Y. for the position of Director of Development, Textile Technologist, P-6, with pay at the rate of $7,102 per annum.

It is the responsibility of the Director to plan, organize, and expedite all research problems, developments, and specification preparations, and to be responsible for the organization and administration of all personnel of the department.

In order to properly carry out the primary function of the Department, namely, research and development, and also some of the minor functions, it is necessary for the Director to make contacts with other government agencies to obtain and exchange information. Contacts will also be made with various manufacturers, organizations and technical societies in order to obtain their assistance and cooperation in Naval Research projects.

• Release of Its 1948 Price List

The United States Testing Company, 1415 Park Avenue, Hoboken, N. J., has announced release of its 1948 Price List. This new edition lists over 1200 tests beginning with Abrasion, Acoustics, Adhesion, and ending with X-Ray, Yardage and Yarn Tests. The Price List is tabulated under the headings; Acoustics, Air Conditioning and Refrigeration Tests, Air Filter Tests, Bacteriological Tests, Chemical Tests, Engineering Tests, Food Tests, Heating & Ventilating, Leather Tests, Optics, Plastic Tests, Precision Measurements, Textile Tests such as Braids, Cord & Twines, Fabric Tests, Wool Fiber Tests, Yarn Tests and Specialized Services.

In the 1948 Price List, the basic test charges remain unchanged. In some cases increases have been found necessary and in other instances reductions based on volume testing have been made where testing equipment is kept operating at full capacity.

Copies of the Price List are available upon request.

• Reports on Standardizing Dyes

Procedures used for standardizing vat dye "Suprafix" pastes and powders "fine" at the I. G. Farbenindustrie Hoechst plant in Germany are described in a report now on sale by the Office of Technical Services, Department of Commerce. The Suprafix pastes were developed as a line of vat dyestuffs for printing.

Mimeographed copies of the 31-page (PB-78276; *Methods of standardization of vat dye Suprafix pastes and powders "fine", Hoechst*) sell for $1.

In a second report are described the product formulas and standardization methods for vat dye powders "fine" and Celanese dyestuffs at the I. G. Farben Ludwigshafen plant. The methods used at Ludwigshafen are different from and alternative to those used at Hoechst, the report states.

Mimeographed copies of the 45-page report (PB-78269, *Methods of standardization of vat dye powders "fine" and Celanese dyes, Ludwigshafen)* sell for $1.25.

Orders for reports should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

• Joins Onyx

Paul D. Jacobs, who has joined the Textile Research and Development Staff of the Onyx Oil & Chemical Company laboratories.

Following his graduation from the University of Michigan in 1939, Mr. Jacobs was employed for three years by the Keuffel & Esser Company, and from 1943 to 1947 was with the Textile Research Laboratories of the American Cyanamid Company in Stamford, Conn., where he specialized in the development of durable resinous textile finishes. He is now doing graduate work in the field of high polymers at the Polytechnic Institute of Brooklyn.

A member of the American Association of Textile Chemists & Colorists, and the American Chemical Society, Mr. Jacobs bring to Onyx a valuable background of knowledge and experience in all types of textile finishes, with particular emphasis on the applications of synthetic resins in this field.

• Georgia Tech Textile Building

The complete and modern textile instructional and research building, now being constructed at a cost of more than one million dollars at the Georgia School of Technology, will be named in honor of the late William Harrison Hightower, one of the outstanding textile engineer-executives of the South, it was announced by Colonel Blake R. Van Leer, President of Georgia Tech.

Approval for this action was recently granted by the Board of Regents of the University System of Georgia, which appropriated $175,000 towards the construction of the building to supplement the $850,000 made available this year from state funds by Governor M. E. Thompson. The William Harrison Hightower Building is scheduled to be completed by the fall of 1948.

• Appointed to Technical Staff

Robert R. McGee has been appointed to the technical staff of the textile division, United States Rubber Company, with headquarters in New York. He was formerly technical supervisor of the company's Reid Mill in Hogansville, Ga., which manufactures duck used in the production of belting, hose and other industrial products. Mr. McGee has been associated with the company's textile division for nine years.

• Appointed Industrial Sales Manager

William N. McKee has been appointed Industrial Sales Manager of the W. A. Cleary Corporation, 254 West 31st Street, New York City, it has been announced by L. Russell Cook, Vice President. Mr. McKee was formerly with the Shell Oil Company.

Mr. Cook mentions this appointment as part of a program of the W. A. Cleary Corporation for expanding their lecithin sales from the food industries where they have been an important factor for a number of years, to the general process industries where an increasing demand for this product has been noted, particularly in the paint, rubber, textile and other industries. Mr. McKee will also have charge of sales of the new Cleary line of germicides, fungicides, and herbicides.

SANDOZ PRESENTS *The color achievement of the month*

Elizabethan Grey BY SUSKANA FABRICS

Here is a color that might have been seen on opening night at the Globe for Shakespeare's newest play . . . or, today, at some function honoring the present Elizabeth. Pale as an echo, the loveliest grey since the Sixteenth Century, it's called—with traditional justice—Elizabethan Grey.

This soft, warm broadcloth is woven by Susquehanna Mills, manufacturers of Suskana® Fabrics for women's wear, men's wear, neckties and upholstery. And Susquehanna is one of a long list of mills that count on Sandoz for colors that compliment the cloth.

For a color like the one illustrated, Sandoz offers its . . .

METOMEGA CHROME GREY GL

a grey that is outstanding for its fastness to light, washing and perspiration. Mill men will like particularly its level dyeing properties by all chrome methods and its unique stability to decatizing—a finishing treatment that rules out many otherwise suitable colors.

For acid, chrome or direct dyes . . . or auxiliary chemicals . . . for both natural and synthetic fibres . . . be guided by the successful "color achievements" you see in these Sandoz advertisements.

SANDOZ CHEMICAL WORKS, INC., 61 VAN DAM STREET, NEW YORK 13, N. Y.

Application laboratories and stocks at Boston, Philadelphia, Charlotte, Los Angeles, Toronto. • Other branches at Providence, Paterson, Chicago.

SANDOZ *thinks ahead with textiles*

SANDOZ

MACBETH
COLOR MATCHING SKYLIGHTS

Textile dyers, finishers and colorists know the Macbeth Color Matching Skylight is a necessity for efficient color matching. Natural daylight at its best, any hour of the day, any day of the year. We will gladly help you with your color matching problems, without obligation.

MACBETH CORPORATION

227 WEST 17th STREET, NEW YORK 11, N. Y.

Now! **The IMPROVED Allcraft "INCONEL" Pail**

Inconel* pails end harmful metallic contamination of dyestuffs, sizing and bleaches. They are especially suitable for use in connection with acid dyeing as well as the application of diazotized, developed colors, and sulfur colors. Inconel resists corrosion by dilute hypochlorites, sizing, and other compounds and solutions used to impregnate fabrics. Because of their long life, *Allcraft* Inconel pails are exceptionally economical.

Improved *Allcraft* Inconel pails are made in five capacities—10, 12, 14, 16, and 20 quarts. They are available from coast-to-coast. Write today for the name of your nearest distributor.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N.Y.

*Reg. U.S. Pat. Off.

INCONEL* (80 NICKEL-14 CHROMIUM)

EMBLEM OF SERVICE INCO TRADE MARK

QUALITY **RICHMOND** PRODUCTS

Less Handling with

AFTER CHLOR

Eliminates 3 to 5 handlings

Bleach with Hypochlorite Rinse and Use

AFTER CHLOR

THAT'S ALL!

Write for FREE Sample

Southern Office
617 Johnston Building
Charlotte, N. C.

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.

1041-43 FRANKFORD AVE., PHILADELPHIA 25, PA.

PYROTEX

SCOURING AGENT

PYROTEX is a most effective scouring agent having excellent wetting out properties which assure immediate scouring action.

PYROTEX can be used in scouring and dyeing of wool, worsted, rayon, acetate, cotton and nylon.

PYROTEX is not affected by acid, alkali, or hard water, and will not precipitate or form scum.

PYROTEX, being neutral, is very adaptable for dyeing of acetate and mixtures thereof.

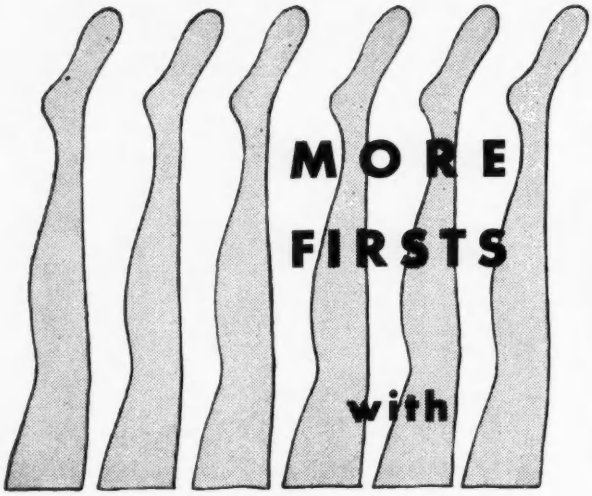
PYROTEX can be used alone or with soap and alkalies. In scouring of woolens and worsteds for piece goods dyeing, it is extremely important that goods be thoroughly free from fats which may cause shaded or cloudy goods. However, this is not the case with PYROTEX. Even though not thoroughly washed out it will assist in dyeing.

S C.P.Inc
REG. U. S. PAT. OFF.

STANDARD CHEMICAL PRODUCTS, Inc.

1301 JEFFERSON STREET, HOBOKEN, NEW JERSEY

HIGH POINT, N. C. | LEAKSVILLE, N. C. | PATERSON, N. J.
CHATTANOOGA, TENN. | PROVIDENCE, R. I. | SACRAMENTO, CAL.



MORE FIRSTS with

NYLON OIL #82

Oil cup for use on full fashioned and seamless hosiery machines. Yarn is passed through slit in the saturated felt protruding from cup.

Seconds or irregulars can be reduced to as little as 2% when Nylon Oil No. 82 is used in running 10. 15 and 20 denier nylon Used straight — not in an emulsion — this oil prevents pick-ups and pulled threads after knitting. Specially blended to avoid effects of dyeing and preboarding. Oil cup illustrated here is available in quantity. Test Nylon Oil No. 82 for yourself. Write for sample now.

Specialties for
SCOURING
STRIPPING
PENETRATING
FINISHING
LUBRICATION

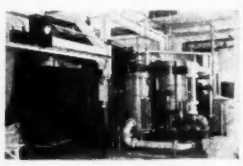
Zurnoil
TEXTILE CHEMICALS

Oils for all textile conditioning requirements.

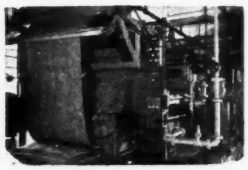
O. F. ZURN COMPANY
PHILADELPHIA 32, PA.
Knoxville, Tenn. • Hamilton, Ontario, Canada

The Fleet Line

DERBY DRY CLEANER
VERSATILITY Is A Leading Characteristic



Installation in a New England mill making women's woolens.



Installation in a Maryland mill making cassimeres, flannels, tweeds and shetlands.

Fabrics now being handled by this machine include woolens, worsteds, rayon mixtures and mohair plushes. Although it involves a considerable investment and volume production, many machines are now in use. Constant improvement in design, greatly decreased solvent consumption and tremendous operating economies account for its popularity.

ADVANTAGES

1. Removal of tar, paint, asphalt, creosote, pigment, chalk, etc.
2. Almost any type of wool oil can be used—even cheap mineral oils.
3. Tremendous savings in oil, through reclamation.
4. Elimination of steam contamination from oil residue.
5. Reduces burling and mending.
6. Great reduction in perching.
7. Minimum oil content in the finishing room.
8. Scouring usually eliminated.
9. Little or no soap required.
10. Big saving in hot water.
11. Possibilities in acid fulling of Derby Dry Cleaned fabrics.
12. Reduction in redyes and seconds

RIGGS AND LOMBARD
INCORPORATED
FOOT OF SUFFOLK ST., LOWELL, MASS.

A COMPLETE LINE OF
DYESTUFFS
for all branches of
TEXTILE DYEING
AND PRINTING—
PAPER AND LEATHER

★

Specializing in fast colors

NOVA CHEMICAL CORPORATION
147-153 Waverly Place
New York 14, N. Y.
WAREHOUSES IN NEW YORK and CHARLOTTE, N. C.

SYNTHETIC DETERGENTS

ANILINE COLORS
NATURAL DYESTUFFS
SIZINGS and FINISHING MATERIALS

UNITED
CHEMICAL PRODUCTS
CORPORATION

Main Office:
753 MONTGOMERY STREET • JERSEY CITY 6, N. J.
Plant:
YORK AND GOLGATE STREETS •• JERSEY CITY 2, N. J.
Branches:
GREENSBORO, N. C. • PAWTUCKET, R. I.
Western Agents: CHEMICAL PRODUCTS CO., AURORA, ILL.

BUY — SELL — TRADE

DYESTUFFS

DIRECT — VAT — CHROME
ACID — NAPHTHOL — ETC.

CHEMICALS

CAUSTIC SODA — SODA ASH,
Sodium Sulphide, Beta Naphthol, Formic Acid, Titanium Dioxide, etc.

SANDERS & SLOAT, INC.
180 Broadway New York 7, N. Y.
Phone: BEekman 3-5894
Cable: PORTRADERS

Complete *Your* reduction-picture

with

VIRGINIA
$Na_2S_2O_4$
SODIUM HYDROSULPHITE

"Virginia" Sodium Hydrosulphite is a widely used reducing agent for cotton vat dyeing, stripping, and decolorizing operations. This concentrated $Na_2S_2O_4$ is a stable, free-flowing, uniformly crystalline white powder, rapidly soluble in water. It is notable for its carefully controlled particle-size and complete solubility . . . 100 pounds of water at 68 degrees F. will dissolve 21.8 pounds of "Virginia" $Na_2S_2O_4$. Shipped in 250-pound steel drums. Your inquiry is invited. VIRGINIA SMELTING COMPANY, West Norfolk, Virginia. *Est. 1898.*

SULFUR DIOXIDE • SODIUM HYDROSULPHITE

VIRGINIA Chemicals

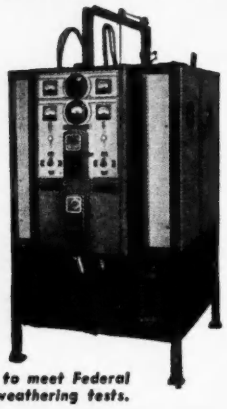
WEST NORFOLK • NEW YORK • BOSTON • DETROIT

WEATHERING TEST FOR TEXTILES

Weathering effects of sunlight, rain, heavy dew and thermal shock reproduced in the laboratory at an accelerated rate that reduces years of actual weathering to a few days of testing in the —

ATLAS TWIN-ARC WEATHER-OMETER

The Twin-Arc Weather-Ometer has full automatic control of light and water periods. The Atlas Cycle Timer unit can be set to reproduce any combination of weathering conditions. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included on the control panel. After setting exposure cycle on the control panel the Weather-Ometer is safe to be left in continuous operation over night without attention except to replace carbons once in 24 hours.



The Atlas Weather-Ometer is required to meet Federal Specifications demanding accelerated weathering tests.

ATLAS ELECTRIC DEVICES COMPANY
361 W. Superior Street, Chicago 10, Illinois

Originators and sole manufacturers for over a quarter of a century. . . Weather-Ometers, Launder-Ometers, Fade-Ometers are the accepted standard accelerated testing machines all over the world.

EXPORTERS—IMPORTERS

Aniline Colors • Dyestuffs • Pigments
and
Textile Chemical Auxiliaries

CHEM-COL COMPANY, INC.
82 WALL STREET NEW YORK (5), N. Y.
CABLE ADDRESS: COLORANTES NEW YORK. ALL CODES

ANILINE OIL
•
CRESYLIC ACID
•
XYLIDINE

COALTAR CHEMICALS CORPORATION
William D. Neuberg, President
GRAYBAR BLDG., 420 LEXINGTON AVE., NEW YORK 17, N.Y.
TELEPHONE: MURRAY HILL 5-9508
CABLE: "COALTARKEM"

LeaTex

The name that means leadership in
CHEMICAL SPECIALTIES
for the
TEXTILE INDUSTRY

"Always Reliable"

LEATEX CHEMICAL COMPANY
2722 N. HANCOCK ST., PHILADELPHIA, PA.

Manufacturers of

SYNTHETIC TEXTILE CHEMICALS

CLOVER CHEMICAL CO.

EAST PROVIDENCE RHODE ISLAND

QUALITY RICHMOND PRODUCTS

MERCOPEN

For mercerizing

•

The mercerizing penetrant which is water soluble

Faster Penetration

Easier rinsibility

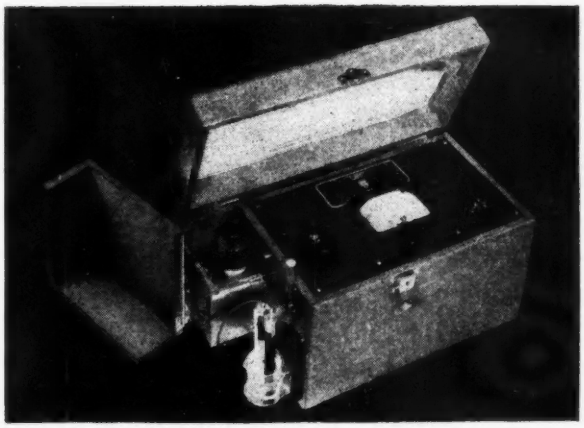
No scum in caustic

Ask for samples

Southern office
617 Johnston Building,
Charlotte, N. C.

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.

1041-43 FRANKFORD AVE., PHILADELPHIA 25, PA.



pH INDICATOR FOR "EVERYBODY"

Here's the pH Indicator for the man who is *not* a pH expert. It's carried around and used wherever desired—in plants as well as labs. It's sturdy and dependable as a temperature indicator. It will stay on the job. To use it, you just make 3 simple adjustments, then put the sample into the beaker and see where the needle points. Its scale is substantially longer and easier to read than in any comparable Indicator.

This Indicator is fine for laboratories, kitchens, refrigerated chests, packing rooms and power plants. "Sticky" weather or surroundings won't affect it, unless the relative humidity is over 95 per cent and the ambient temperature higher than 85 F. Solution to be checked can be at any temperature to 50 C (120 F). Thick solutions and "soft" solids can be checked almost as easily as slurries or clear liquids. Nearby electrical equipment won't affect the Indicator.

Further details are in Catalog EM9-96, sent on request.

LEEDS & NORTHRUP COMPANY, 4965 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

Jrl Ad E-96(25a)

Now Available

10th Edition

Chemical Technology of the Fibers

by DR. LOUIS A. OLNEY

Professor Emeritus of Chemistry and Dyeing
Lowell Textile Institute

President Emeritus
American Association of Textile Chemists and Colorists

TEXTILE ASSOCIATES, INC.
LOWELL TEXTILE INSTITUTE
LOWELL, MASSACHUSETTS

$3.00 per copy

Elementary Organic Chemistry

by DR. LOUIS A. OLNEY

Now available at

$2.00 per copy

TEXTILE ASSOCIATES, INC.
LOWELL TEXTILE INSTITUTE
LOWELL, MASSACHUSETTS

The Theory and Practice of Wool Dyeing

by C. L. BIRD, M.Sc., F.R.I.C.

Lecturer in Dyeing University of Leeds
Editor, Journal of the Society of Dyers and Colourists

Now Available at

12/6

Order should be forwarded with remittance to

THE GENERAL SECRETARY
THE SOCIETY OF DYERS AND COLOURISTS
32-34 PICADILLY, BRADFORD, YORKSHIRE, ENGLAND

Best by every Test-

assures a better hand for your yarns and fabrics—

AQUAKAL 74

Aquakal 74 is the rapid penetrant and leveling agent that tops the list — by Draves Test and on your machines. Use it wherever fast, even wetting and penetration are necessary.

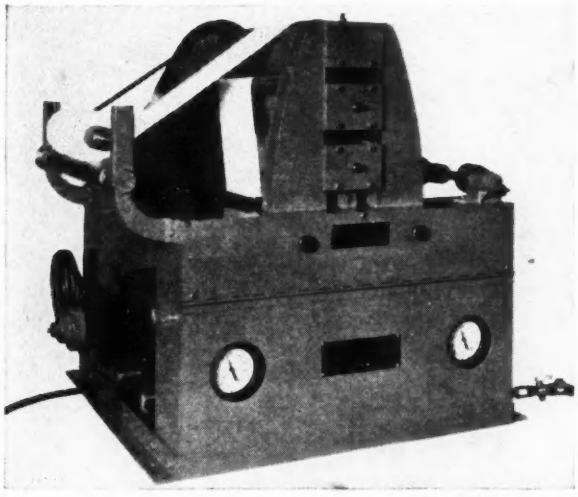
•

HYDROXY HAND CREAM — FOR THE OPERATORS HANDLING NYLON, TO KEEP THEIR HANDS SMOOTH.

Kali MANUFACTURING COMPANY

Manufacturing Chemists

427 MOYER STREET PHILADELPHIA 25, PA.

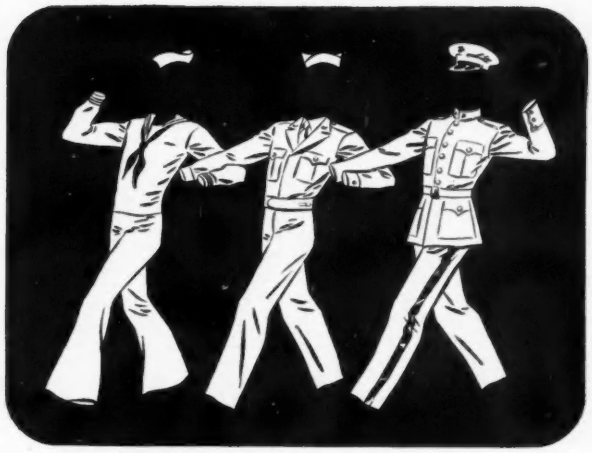


Laboratory Pad

Colors are matched and formulas tested without cost of entire lot. Pressures controlled pneumatically—can be adjusted to each air cylinder. Arranged with motor drive for 2 to 1 speed range —7½ to 15 yds. per minute.

H. W. BUTTERWORTH & SONS COMPANY
Serving the Textile Industry Since 1820
Main Office and Works: Philadelphia 24, Pa.

Butterworth



Solvay Chlorine ...

for Uniform LOW COST Bleaching

SOLVAY LIQUID CHLORINE is a bleaching agent that gives uniform results. You are not experimenting with SOLVAY Liquid Chlorine. It is the oldest successful bleaching agent, and is the *lowest in cost!*

DO AS SO MANY BIG textile houses do... specify SOLVAY Liquid Chlorine. Not only is it economical to use, but you always get controlled quality, purity and uniform results.

Safeguards against spotty bleaching

Controls the quality of water

SOLVAY LIQUID CHLORINE

SPECIFY QUALITY ...SPECIFY SOLVAY

SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit • Houston
New Orleans • New York • Philadelphia • Pittsburgh • St. Louis • Syracuse

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

BURK-SCHIER

BURKART-SCHIER CHEMICAL CO., CHATTANOOGA, TENN.

• CLASSIFIED ADVERTISEMENTS •

CONFIDENTIAL EMPLOYMENT SERVICE—For Dyers, Chemists, Colorists, Managers, Superintendents and others seeking positions and for employers seeking men. Many positions paying attractive salaries, open for capable men. Charles P. Raymond Service, Inc., 294 Washington St., Boston, Mass. Over 45 years in business.

TECHNICAL SALES REPRESENTATIVE: Wanted by well-established sizing specialists to help develop line of textile auxiliaries and finishes. Require: young man, at least 5 to 10 years' experience in wet processing and finishing, good sales personality. Good salary for right man, excellent future. Southeast. Write Box 344.

WANTED CHEMIST: Experienced in bleaching, dyeing, printing and finishing cotton goods, to take charge of laboratory and quality control. Location—New England. Write Box 369.

POSITION WANTED: Cotton and rayon piece goods finishing control chemist with 23 years' experience. College graduate, able to assume charge of laboratory. Prefer location north of Virginia along seaboard. Write Box 349.

WANTED

TRICOT KNIT GOODS DYER

Must be capable of supervising dyehouse with production of approximately sixty thousand pounds per week on both underwear and outerwear fabrics. Excellent opportunity for the right man. Prominent company. Qualified applicants should submit full information giving experience, age, marital status and references.

Write Box No. 397

Technical man wanted for sales and demonstration work in New England. Experience in textile printing and finishing desirable. Excellent opportunity with large chemical manufacturers. State age, experience and education. Write Box No. 385.

WANTED: Assistant dyer for large New England plant. Experienced in spun rayon and mixture fabrics. Must be willing to take 3rd shift work. Write Box 386 giving qualifications, experience and salary requirements.

Position Wanted: TEXTILE RESEARCH DIRECTOR: Successful work on textile finishes, dimensional stabilization of textiles, surface-active agents and textile auxiliaries. Numerous publications. Many years of plant, laboratory and promotional experience. Available on or before March 31st. Write Box No. 388.

POSITION WANTED: TEXTILE CHEMIST: Wide knowledge and experience in manufacture and application of surface-active agents and textile auxiliaries. Interested in opportunity to manufacture such chemicals on partnership basis with someone having manufacturing facilities and sales connections.

Write Box No. 389

ARE YOU THE RIGHT MAN?

We offer an unusual opportunity for the right man to develop sales volume with a new line of chemical specialties for the textile and allied industries. Only personalities qualified by background and sales performance should apply.

E. F. DREW & CO., INC.

Oil & Chemical Division — Boonton, N. J.

WANTED: Colorist, old established dyestuff concern offers excellent opportunity for experienced dye tester. Capable complete charge laboratory. Write Box No. 395.

• CLASSIFIED ADVERTISEMENTS •

NOTICE

CLASSIFIED ADVERTISEMENTS

ARE RESTRICTED TO

HELP WANTED — POSITIONS WANTED

MACHINERY (wanted or for sale)

OTHER TYPE COPY WILL NOT BE ACCEPTED.

American Dyestuff Reporter

POSITION WANTED: Manager's Assistant or Technical Representative. Experience, Superintendent machine printing; colorist screen printing; Demonstrator sales application laboratory; Dyer cellulosic fibers. Vats, soluble Vats, Directs, Chromes, Stabilized Azoics, and Pigments. Lowell Textile Graduate. Prefer Metropolitan area. Write Box No. 391.

WANTED: Dyer on cotton skeins, ribbons, narrow fabrics. Direct dyeing, developed and vats. Klauder Weldon and hand tub. State experience, education and salary expected in first letter. Complete responsibility small New England plant. Write Box No. 392.

WANTED: Hosiery dyer capable of handling large production 15 denier nylons. Excellent position for qualified man.

Write Box No. 393

WANTED: Used 4-roll hydraulic calendar consisting of two stell and two paper rolls. Write Box No. 394.

WANTED—CHEMICAL SPECIALTY SALESMAN
The man selected for this position will have technical training and experience in textile processing and have behind him a highly successful selling career in North and South Carolina. To the right man, this position offers $7,000 to $10,000 per year, commissions, and expenses. The opportunity to buy into our prosperous and expanding business will be offered the individual selected upon demonstration of his capabilities. Reply in detail. All replies held in strict confidence.

Write Box No. 396

WANTED: Colorist in Roller Printing Plant. Give full history in first letter. Write Box No. 390.

Opportunity Unlimited!

FOR A CHEMICAL SPECIALTY SALESMAN

IF

you are not completely satisfied with your present connection

you have a large number of accounts requiring quality products

you are interested in a liberal drawing and commission arrangement

you want to represent a reputable firm with unsurpassed production facilities

WRITE TO

CARLSTADT CHEMICAL COMPANY

CARLSTADT **NEW JERSEY**

Have you ordered a Binder for your Reporter copies?

Maroon leatherette, gold lettered, large enough to hold twenty-six issues, only $3.00 post-paid.

Please send check with order to:

AMERICAN DYESTUFF REPORTER

ONE MADISON AVENUE

New York 10, N. Y.

10 PRODUCTS of PROVEN DEPENDABILITY

WHICH SHOULD WARRANT YOUR ATTENTION

*AQUAROL: A water repellent for processing woolen, cotton and rayon fabrics, also produces excellent results in splashproofing or finishing all types of hosiery.

*PARAMINE T A: A cation active softener for processing cotton and rayon cloth to obtain a soft, smooth, pleasing finish.

ANTHOMINE: Auxiliary used in all wool dyeing processes to produce a uniform shade and impart a soft pleasing hand to stock, yarn and cloth. Improves exhaustion of dye bath and increases color yield. Very effective for levelling shade of tippy and mixed wools.

*PARAPON S A: A highly efficient leveler and softener for dyeing and finishing all types of yarn, cloth and hosiery to produce a uniform dyeing and a soft full hand.

*ARIPEL F S: Finish and gas inhibitor for processing dyed acetate rayon—produces a soft, full feeling finish and prevents gas fading of the color.

*LANITOL F: A synthetic detergent possessing exceptional scouring and washing properties for processing wool, cotton, rayon or nylon.

*ALGEPON V A: Auxiliary used in dyeing vat colors to retard reoxidation of the reduced bath and produce a solid and uniform shade—also effective in stripping vat dyeings.

*CULOFIX: Used as an after treatment in last rinse to prevent bleeding of direct dyed cotton or rayon in water.

*DIAZONOL A C: For boiling out cotton cloth in pressure or open kiers to produce greater absorbency and cleaner material. Excellent for pre-boiling knitted cloth in preparation for chlorine bleach. Also used with good results for boiling out cotton or rayon cloth on the jig.

*TETRANOL: A rapid wetting and penetrating agent. Active in acid, alkaline and salt solutions and not affected by hard water, may be used in all types of dyeing operations to insure positive penetration of color and a uniform and solid shade.

And a complete line of Oils, Chemicals, Softeners and Finishes for Wet Processing All Textile Fibres

*REG. U. S. PAT. OFF.

ARKANSAS CO., INC.
Newark, New Jersey
Manufacturers of Industrial Chemicals for Over 40 Years

INDEX TO ADVERTISERS

Aktivin Div., The (Heyden Chem. Corp.)	
Alco Oil & Chem. Corp.	
Althouse Chemical Co.	
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	XIII
American Cyanamid Co. (Ind. Chem. Div.)	Second Cover
American Dyewood Company	
American Key Products, Inc.	
Anders Chemical Corp.	
Arkansas Company, Inc.	XLII
Armour and Co.	X
Arnold, Hoffman & Co., Inc.	XX
Atlantic Chemical Co., Inc.	
Atlas Electric Devices Co.	XXXVI
Becco Sales Corp.	
Bick & Co., Inc.	
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XL
Butterworth Sons Co., H. W.	XXXIX
Calco Chemical Division American Cyanamid Co.	
Calgon, Inc.	XVIII
Campbell & Co., Inc., John	
Carbic Color & Chemical Co., Inc.	XXVIII
Carbide & Carbon Chemicals Corp.	XXI
Chem-Col Company, Inc.	XXXVI
Ciba Company, Inc.	III
Clover Chemical Co.	XXXVII
Coaltar Chemicals Corp.	XXXVI
Colgate-Palmolive-Peet Co.	IV
Commonwealth Color & Chemical Co.	
Drew & Co., Inc., E. F.	V
Du Pont de Nemours & Co., E. I.	
Dyestuff Division	
Fine Chemicals Division	
Emery Industries, Inc.	
Fancourt & Co., W. F.	
Geigy Company, Inc.	Front Cover
General Chemical Division, Allied Chemical & Dye Corp.	VII
General Dyestuff Corp.	
Girdler Corp., The	VI
Grinnell Co., Inc.	
Gurley, W. & L. E.	
Hardesty Co., W. C.	
Hart Products Corp.	
Hefti & Co., M.	XXVI
Hercules Powder Co.	XLIII
Heyden Chemical Corp.	IX
Hooker Electrochemical Co.	
Interchemical Corp., Textile Colors Div.	
International Nickel Co., Inc.	XXXII
International Salt Co., Inc.	
Kali Manufacturing Co.	XXXIX
Kelco Co.	XIX
Laurel Soap Mfg. Co., Inc.	
Leatex Chemical Co.	XXXVI
Leeds & Northrup Co.	XXXVII
Mac Beth Corp.	XXXII
Maher Color & Chemical Co.	
Mathieson Alkali Works, Inc.	
Maywood Chemical Works	VIII
Monsanto Chemical Co.	XXIII
Myles Salt Co., Ltd.	
National Aniline Division, Allied Chemical & Dye Corp.	XV
National Carbon Co., Inc.	Third Cover
National Starch Products, Inc.	
Nopco Chemical Co.	XVI
Nova Chemical Co.	XXXIV
Nuodex Products Co., Inc.	
Nyanza Color & Chemical Co.	XXII
Onyx Oil & Chemical Co.	XII
Oronite Chemical Co.	
Pabst Sales Company	
Perkins & Sons, Inc., B. F.	XIV
Philadelphia Quartz Co.	
Procter & Gamble	XXIV
Refined Products Corp.	XI
Richmond Oil Soap & Chemical Co., Inc.	XXXII, XXXVII
Riggs & Lombard, Inc.	XXXIV
Rohm & Haas Company	XLIV
Rona & Co., Inc., L. L.	
Royce Chemical Co.	Back Cover
Rumford Chemical Works	
Sanders & Sloat, Inc.	XXXV
Sandoz Chemical Works, Inc.	XXXI
Scholler Bros., Inc.	
Sharples-Continental Corp.	XXVII
Sindar Corporation	
Smith, Drum & Co.	
Solvay Sales Div., Allied Chemical & Dye Corp.	XXXIX
Sonneborn Sons, Inc., L.	
Standard Brands, Inc.	XXV
Standard Chemical Products, Inc.	XXXIII
Stein Hall & Co., Inc.	
Tennessee Eastman Corp.	
Titan Chemical Products, Inc.	
Union Carbide & Carbon Corp.	XXI, Third Cover
United Chemical Prod. Corp.	XXXV
Van Vlaanderen Machine Co.	
Virginia Smelting Co.	XXXV
Wallerstein Co., Inc.	XXX
Warwick Chemical Co.	
Watson-Park Company	XVII
Wolf & Co., Jacques	
Young Aniline Works	
Young Co., J. S.	
Zinsser & Co., Inc.	
Zurn Co., O. F.	XXXIV

It will pay you to re-investigate

YARMOR

Hercules Pine Oil

WETS AND PENETRATES

REMOVES DIRT AND GREASE

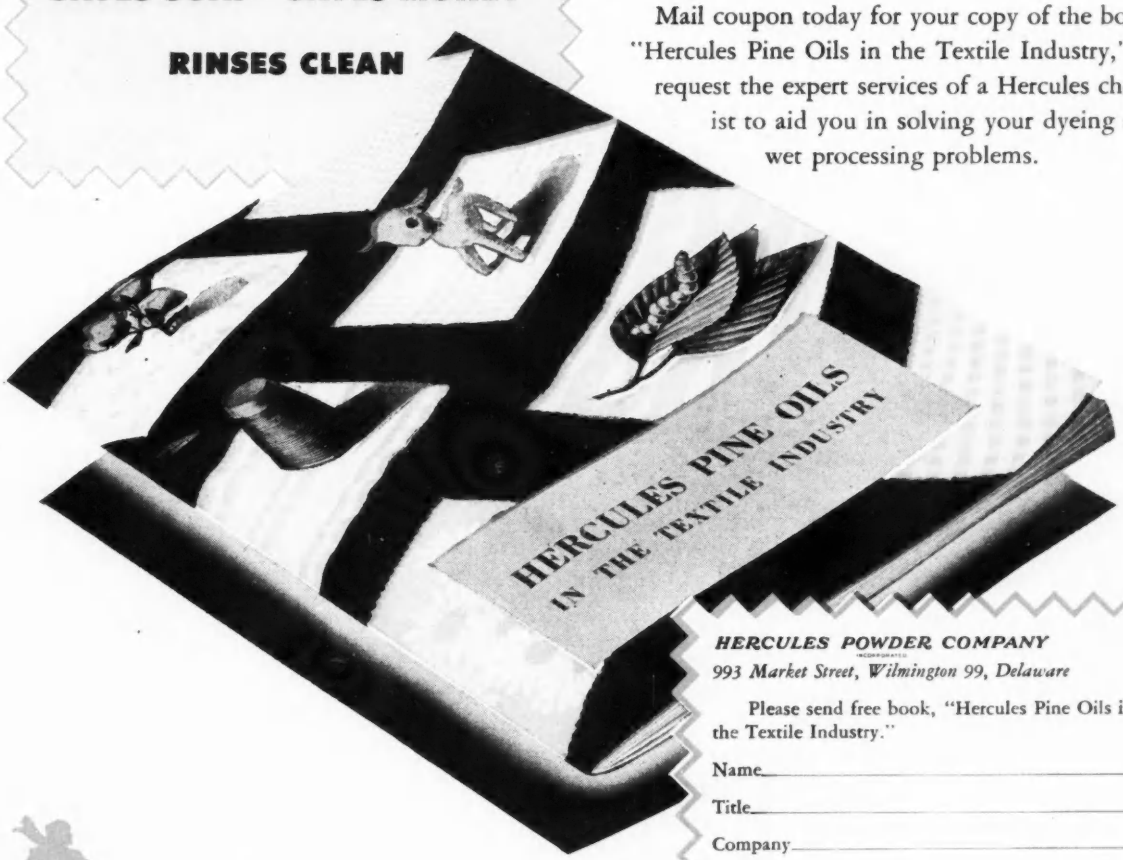
SAVES SOAP—SAVES MONEY

RINSES CLEAN

Once again Hercules Yarmor® is back in full supply!

This superior textile wetting agent is not just ordinary pine oil or a pine oil substitute, but a product quality-controlled for optimum terpene content, maximum wetting, penetrating, and emulsifying action.

Mail coupon today for your copy of the book, "Hercules Pine Oils in the Textile Industry," or request the expert services of a Hercules chemist to aid you in solving your dyeing and wet processing problems.



HERCULES POWDER COMPANY
INCORPORATED
993 Market Street, Wilmington 99, Delaware

Please send free book, "Hercules Pine Oils in the Textile Industry."

Name_____

Title_____

Company_____

Street_____

City_____ Zone____ State____

NYB-1

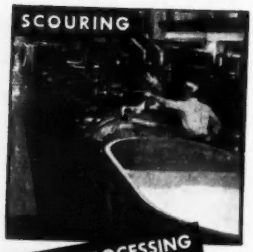
HERCULES

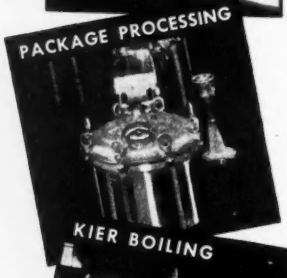
® REG. U. S. PAT. OFF.

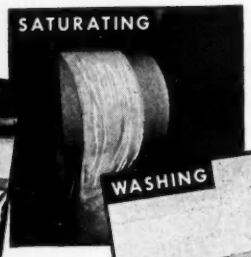
Jack of all Trades

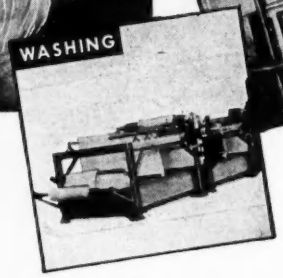
—and Master, too!

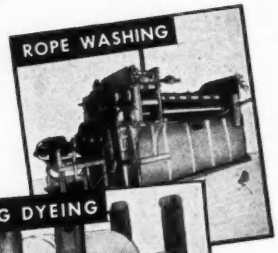
TRITON 770

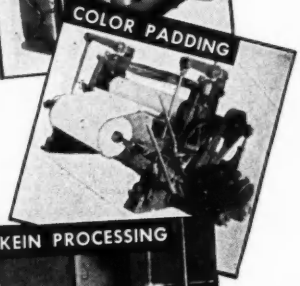












Mill men know TRITON 770 CONCENTRATE as a dependable detergent, wetting and emulsifying agent. But did you ever realize how *many* different jobs TRITON 770 CONCENTRATE does in the textile mill? Glance over the applications shown on this page . . . they show *some* of the processes in which this dependable chemical helps in making textile mill operations more efficient and more economical. Write for full information on how you can use this fine chemical to advantage.

THE SERVICE THAT BUILT OUR BUSINESS CAN HELP YOURS

Our business has been built largely on the practical help we have been able to give our customers, right in their own plants, in adapting Rohm & Haas products to their needs.

Our representatives are men with technical training and practical experience in the use of industrial chemicals. Call in a member of our textile chemicals department when you need assistance in choosing or using . . .

Chemicals for Fine Textiles

TRITON *is a trade-mark, Reg. U. S. Pat. Off.*

Represented in Canada by Rohm & Haas Company of Canada, Ltd., Toronto; and in South America by Cia. Rohm y Haas, S. R. L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

ROHM & HAAS COMPANY

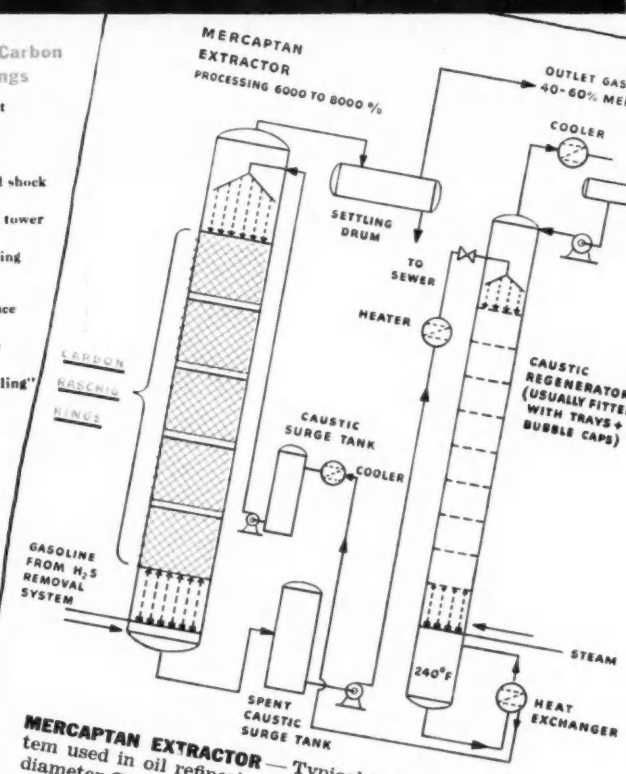
WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals including Plastics • Synthetic Insecticides • Fungicides • Enzymes • Detergents Germicides • Chemicals for the Leather, Textile, Ceramic, Rubber, Paper, Petroleum and other Industries

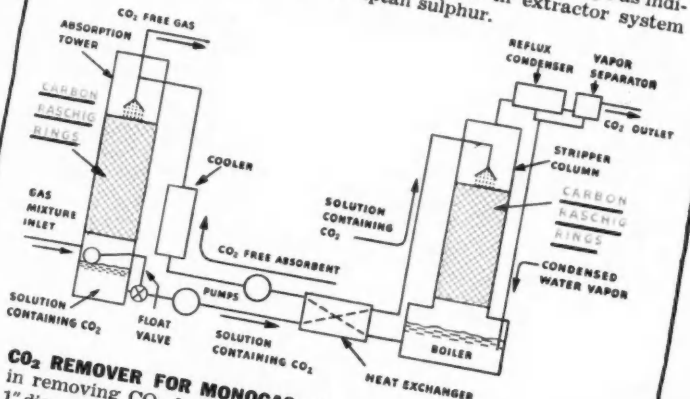
Pack your towers...with CARBON Raschig Rings!

Advantages of Carbon Raschig Rings

- Corrosion resistant
- Light in weight
- Immune to thermal shock
- Won't crush in the tower
- Minimum of chipping and spalling
- More contact surface
- Low back pressure
- Eliminate "channeling" of flow material



MERCAPTAN EXTRACTOR — Typical Mercaptan extraction system used in oil refineries. Extractor is usually packed with 1" diameter Carbon Raschig Rings, either solid or by trays as indicated. 10% to 20% NaOH solution used in extractor system removing up to 60% of Mercaptan sulphur.



CO_2 REMOVER FOR MONOGAS—Typical extraction system used in removing CO_2 from Monogas. Both towers are packed with 1" diameter Carbon Raschig Rings for maximum contact surface, absence of "channeling," and minimum back pressure. Carbon Raschig Rings are suitable to a wide range of tower-packing jobs.

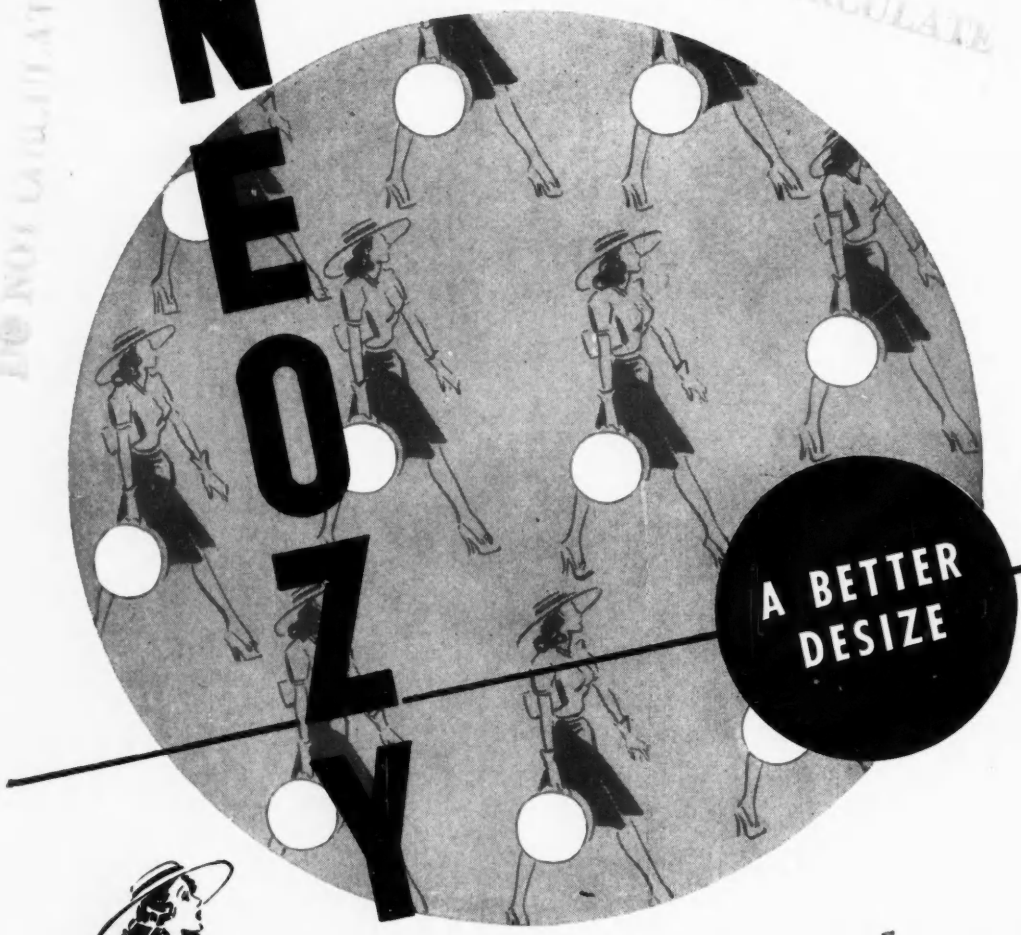
● "National" "Kempruf" Carbon Raschig Rings provide the most economical and efficient tower-packing material for reaction and scrubbing towers handling corrosive agents, such as hydrofluoric acid, organic-hydrochloric mixtures, and hot aqueous alkalies. These rings are also excellent in extraction systems . . . towers in which sudden temperature changes result in severe thermal shocks . . . rectifying towers . . . and tower processes where thorough dispersion is essential to satisfactory operation.

For more information, write to:
NATIONAL CARBON COMPANY, INC., Dept. AD

The terms "National" and "Kempruf" are registered trade marks of
NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

DO NOT CIRCULATE

NEOZYME*



A BETTER DESIZE

ROYCE CHEMICAL CO.

*Reg. Trade Mark

made only by ROYCE

Complete removal of starch, gelatine, other sizing materials—at lowest possible costs—that's what you want from a desizing agent. And that's what you'll get—past performance proves—from this highly concentrated enzymatic powder.

NEOZYME IS ECONOMICAL . . . goes nine times farther than any liquid desize . . .

IT'S RAPID . . . desizing completed with minimum lay-over.

DOES NOT COLOR . . . completely colorless, leaves no trace.

DOES NOT LOSE STRENGTH . . . strength-loss negligible after 28 months storage.

Remember these important points! Neozyme is a *better* desizing agent. It's made only by Royce.

ROYCE CHEMICAL CO.

CARLTON HILL, NEW JERSEY

MANUFACTURERS OF DRYTEX* · PAROLITE* · DISCOLITE* · VELVORAY*
FABRITEX* · GUMOLITE* · CASTROLITE* · VATROLITE* · ZIPOLITE*

3050